The Relationship between Resilience and Symptom Remission in Schizophrenia

Effects of Experienced Resilience on Symptom Remission at 2-year follow-up

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What are the Effects of Perceived Resilience, Hope and Self-efficacy on Symptom Remission in Schizophrenia?

A thesis emphasizing the importance of personal beliefs and values for persons diagnosed with schizophrenia.

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Abstract

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Title: The Relationship between Resilience and Symptom Remission in Schizophrenia. Effects of Experienced Resilience on Symptom Remission at 2-years follow-up.
Supervisors: Associate Professor Anne-Kari Torgalsbøen and Post-doctoral Research Fellow Christine Mohn.

Background: The concept of recovery in schizophrenia has been reformed to include, in addition to symptom remission, social function, role functioning and daily functioning. Persons who have recovered from schizophrenia have published accounts of what has been important for them in their way to recovery. The perceiving of and dynamic interaction with situations, relations and self has been found to be important in a recovery process that enables hopes for a future that is valuable. These relations are integrated in the concept of resilience, which is defined as a positive outcome in psychological wellbeing despite the adversity of schizophrenia. The purpose of this thesis is to investigate whether there is a statistically significant relationship between degrees of resilience and symptom remission. The conceptualisation of resilience as both a trait and a process in schizophrenia is addressed. An additional aim is to find out if degrees of resilience are predictive for symptom remission in schizophrenia. Relations that foster symptom remission are important to investigate, as it is estimated that one per cent of the population have a diagnosis within the schizophrenia spectrum, and life courses involving schizophrenia are found to involve diverse adversities.

Methods: Measures of perceived resilience, hope and perceived self-efficacy were administered by the principal researcher to a group of 28 young adults with a recent debut of schizophrenia over a period of two years. Ratings of positive and negative symptoms were assessed by the principal researcher according to the Positive and Negative Symptoms Scale during the first year and at 2-year follow-up.

Results: Significant results on the relationship between resilience and symptom remission were found. Significant and non-significant results on correlations between different assessments of resilience found resilience to be conceptualised as both traits and processes. Investigation of predictive value of resilience on symptom remission found that high levels of experienced resilience are more than 13 times as likely to predict symptom remission at 2-year follow-up.

Conclusions: Despite the low number of participants in this study, statistically significant results between resilience and symptom remission were found. Experienced resilience is found to be conceptualised as traits and processes. It is demonstrated that high degrees of resilience are predictive for symptom remission. These results suggest that focusing on experienced resilience in treatment can promote symptom remission.

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1 Introduction

1.1 Schizophrenia.

Schizophrenia is an illness that, according to researchers, has always been present in the population, but it was first in the nineteenth century that the illness was systemised. The first description of what we would call schizophrenia today was made by Doctor of Medicine John Haslam in 1809, he described a casus he would classify as "a form of insanity that occurs in young persons" (Malt, Dahl, & Retterstøl, 2003, p. 194) In 1896 Professor of Clinical Psychiatry Emil Kraepelin gathered the existing diagnostic categories of hebephrenia, catatonia, and paranoid psychosis by using the term "dementia praecox" (Cutting & Shepherd, 1987, p. 13) Psychiatrist Eugen Bleuler modified the diagnostic formulation in 1911 and called "dementia praecox" for "Die Gruppe der Schichophrenien" (Cutting & Shepherd, 1987, p. 59) For as long as the phenomena of schizophrenia has been known, there has been a continuous debate on how schizophrenia should be classified (Malt et al., 2003). In DSM-III a broad definition of schizophrenia was replaced to one of the narrowest concepts of the phenomena. As cited in Torgalsbøen (2011), Warner and de Girolam (1994) found that for every person with a narrowly-defined diagnosis of schizophrenia, there are four other persons in the population that are classified to be in the broader-defined diagnosis of schizophrenia (Torgalsbøen, 2011). A new view on this topic is included in DSM-V with the organising of Schizophrenia Spectrum and Other Psychotic Disorders (DSMPsychiatryOnline, 2014). In total, one per cent of the population has a lifetime risk of developing schizophrenia (Andreassen & Steen, 2011).

1.1.1 Positive symptoms, negative symptoms and neurocognition.

Several studies (Liddle, 1987, Mueser, Curran & McHugo, 1997,and Van der Does, Dingemans, Linszen, Nugter & Scholte, 1993) on the dimensions of schizophrenia agree on at least three major groups of symptoms, including positive symptoms, negative symptoms and cognitive impairments (Hersen, Turner, & Beidel, 2007). Many researchers have tried to identify two types of schizophrenia, one type with mainly positive symptoms and one type with mainly negative symptoms. Categorizing in two categories has been difficult since the symptoms often fluctuate (Malt et al., 2003). Positive symptoms refer to thoughts, sensory experiences and behaviors that are absent in persons without the illness but present in persons

with schizophrenia. Common examples include hallucinations (e.g. hearing voices, seeing visions), delusions (e.g. believing that people are persecuting the person) and bizarre, disorganised behavior (e.g. maintaining a peculiar posture for no apparent reason). The positive symptoms of schizophrenia tend to fluctuate over the course of the disorder and are often in remission between episodes of the illness (Hersen et al., 2007). Negative symptoms refer to the absence or diminution of cognition, feelings or behaviors which are normally present in persons without the illness. Common negative symptoms include blunted or flaunted affect, poverty of speech, anhedonia (inability to experience pleasure), apathy, psychomotor retardation and physical inertia. Cognitive impairments refer to difficulties in verbal and visual learning and memory, working memory, attention or vigilance, abstract reasoning or executive function and speed of information processing (Hersen et al., 2007). Rund and collaborators (2005) found in the Bergen Oslo-project that approximately one out of three patients with schizophrenia is cognitively unaffected. They found that 45 per cent had mild cognitive impairments and that 15 per cent had extensive cognitive impairments (Sundet, 2011). Research has shown that cognitive impairment is an important aspect regarding schizophrenia, either the impairment exists before, parallel or is developing after the debut of symptoms (Sundet, 2011).

1.1.2 Comorbidity

As cited in Hersen (2007), Turner & Beidel (2008), Freeman & Garety (2003) found that aside from the core symptoms of schizophrenia, many persons with a schizophrenia diagnosis experience negative emotions (e.g. depression, anxiety, anger) as a consequence of their illness (Hersen et al., 2007). Depression is quite common with a comorbidity rate of 45% (Leff, Tress, & Edwards, 1988). Several studies (Argyle, 1990, Braga, Mendlowicx, Marracos & Fugueria, 2005, Cosoff & Hafner, 1998, Penn, Hope, Spaulding & Kucera, 1994, and Tien & Eaton, 1992) have found that anxiety is common in schizophrenia with an estimated comorbidity of 43%, and is a frequent precursor for psychosis (Hersen et al., 2007). Approximately 50% of all persons with schizophrenia diagnosis have a lifetime history of substance use disorder, and 25% to 35% cent have a recent history of such a disorder (Mueser, Bennett, & Kushner, 1995). Several studies (Bromet, Fochtmann, Carlson & Tanenberg-Karant, 2005, Drake, Gates, Whitaker & Cotton, 1985, Jobe & Harrow, 2005 and Roy, 1986) have reported that it is generally estimated that approximately 10% of persons with the illness die from suicide (Hersen et al., 2007). Recent research carried out by Palmer,

Pankratz & Bostwick (2005) (Inskip; Harris & Barraclough, 1998) examining suicide rates has lowered this estimate to around 4.0% to 5.6% (Hersen et al., 2007).

1.1.3 Course and prognosis

Kraeplin viewed schizophrenia as a latent factor in the individual that can improve but which always reverts. He stated in 1896 "The course of dementia is generally regular and progressive. It is rare to see a substantial remission of the symptoms; at least the excitement disappears, but the mental impairment remains. On the other hand, it is fairly common to find patients who are calm, whose condition has "improved", but who revert even after years to a state of excitement" (Le & Urgård, 2011, p. 1) Both Kraeplin and Bleuler considered remission to be possible, but this was only temporarily. Kraeplin viewed recovery as a temporary remission, and Bleuler viewed remission as a residual state. Bleuler noted in 1908: "In schizophrenia there is no cure in the sense of restitutio ad integra, (…). Whenever I have been able to examine any of those who have been pronounced cured I have found a residue of the illness" (Le & Urgård, 2011, p. 1) Kraeplin reported in 1904 that 8% to 13% of his long term in-patients recovered and 17% of the patients improved from the illness on the long term. Clinicians at his time did not approve the studies and called it wrongly diagnosed "dementia praecox" (Le & Urgård, 2011).

The pessimistic view on the prognosis of schizophrenia and recovery persisted up until the Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV). As cited in Torgalsbøen (2011), DSM-III stated that if the person with a schizophrenia diagnosis functioned on a premorbid level, it was necessary to question the original diagnosis. This view was modified in DSM-IV were it was stated that full recovery is possible, but not normal (Torgalsbøen, 2011). Today, DSM-V states that: "The course appears to be favorable in about 20% of those with schizophrenia, and a small number of individuals are reported to recover completely" (DSMPsychiatryOnline, 2014) The term "recover completely" is not defined, nor is "a small number of individuals", which gives a more pessimistic impression of recovery from the illness than is reported from research.

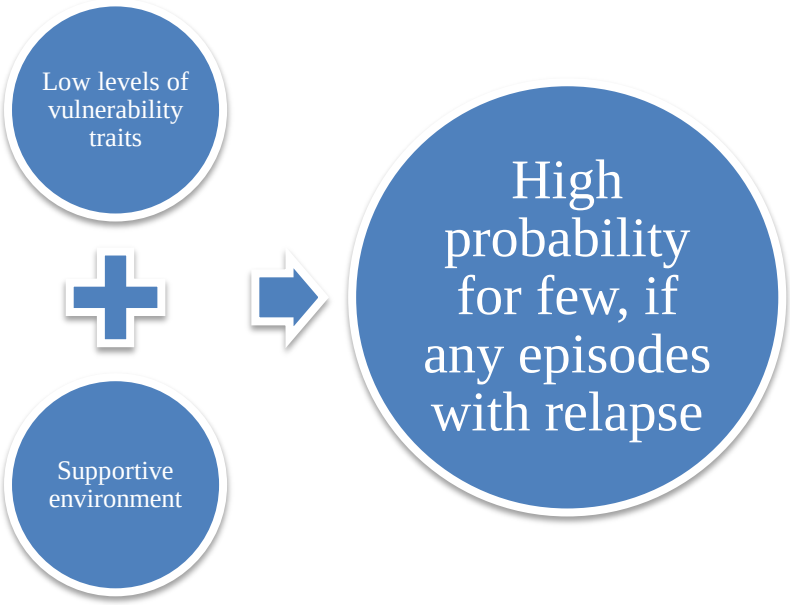
Several studies (Bleuler, 1972, Ciompi and Müller, 1976, DeSisto, Harding, Ashikaga, McCormick and Brooks, 1985, Harding, Brooks, Ashikaga, Strauss and Breier, 1987, Hinterhuber, 1973, Huber, Gross and Schüttler, 1979, Kreditor, 1977, Marinow, 1974, Ogawa, Miya, Watarai, Nakazawa, Yuasa and Utena, 1987, Tsuang, Woolson and Fleming,

1979 and Harrow and Jobe, 2010) have shown that sustained remission and full recovery is possible in more individuals than suggested by the latest version of DSM (Ciompi, Harding, & Lehtinen, 2010). Ciompi, Harding and Lehtinen (2010) commented their deep concern regarding the pessimistic view on recovery from schizophrenia and stated that findings from these convergent 11 world studies of 20 – 30 + years from first admission "have consistently shown that persons labeled with prolonged and episodic forms of schizophrenia have a strong possibility of favorable long-term outcomes if given half a chance" (Ciompi et al., 2010, p. 437). Today there is common knowledge between researchers that 20% to 25% of patients diagnosed with schizophrenia obtain full recovery from the illness. Full recovery is here defined as being absent of symptoms or to have minimum levels of symptoms over a longer period of time and to have a good social and role-functioning (Harding, 1994; Warner, 1994). Full recovery is no longer viewed as a temporary state but as a stable state. The symptom criteria for remission from schizophrenia is in this thesis defined as being absent or having a minimum of symptoms in a period of six months. Full recovery is in the study this thesis is based on defined as absence or minimum of symptoms over two years, to have a good social function, a good role function and to be able to take care of day-to-day needs (Andresen, Oades, & Caputi, 2003; Kay, Flszbein, & Opfer, 1987). Being in remission is part of and a predictor for full recovery as absence or having a minimum of symptoms is part of being fully recovered from this illness. The 11 world studies have shown that recovery and full recovery can be found in 46% to 68% of persons diagnosed with schizophrenia, which gives a more positive outlook for the prognosis (Torgalsbøen, 2011).

1.1.4 Vulnerability and schizophrenia

Today there is a new view on remission and full recovery in schizophrenia. Zubin et al described the phenomena in the following way in 1977: "The one feature that all schizophrenics have in common is not the ever presence of their illness, but rather the ever presence of their vulnerability" (Zubin & Spring, 1977, p. 204). The vulnerability construct is differentiated in the two components inborn and acquired vulnerability. Inborn vulnerability consists of genes and is reflected in the internal environment and neurophysiology of the individual. The acquired component is due to the influence of traumas, specific diseases, perinatal complications, family experiences, adolescent peer interactions, and other life events that either enhance or inhibit development of a following disorder (Zubin & Spring, 1977). The two components of vulnerability may be defined as traits and processes.

Figure 1: Low levels of vulnerability, good premorbid adjustment and a supportive environment correlate negatively with episodes of relapse.



Vulnerability is found in higher or lower levels in every individual and under suitable circumstances and these levels were suggested to be able to express themselves in episodes of schizophrenia. Persons were suggested to have different coping abilities, a coping breakdown may open the way for the eruption of a psychological disorder (Zubin & Spring, 1977). Maintenance treatment (Goldberg, Schooler, Hogarty, & Roper, 1977) and follow-up studies (Jablensky, Sartorius, Gulbinat, & Ernberg, 1981) had found that a pattern of disorder succeeded by cycles of improvement and relapse. On the basis of these studies Zubin and Spring (1977) further noted that some persons with schizophrenia have high levels of vulnerability while others have low levels of vulnerability, they found that degree of vulnerability has an effect on episodes with relapse. The persons who relapse are suggested to return to hostile environments (Jablensky et al., 1981; Zubin & Spring, 1977). Later studies have supported the view that hostile environments have an effect on relapses (MacMillan, Gold, Crow, Johnson, & Johnstone, 1986; van Zelst, 2009) and that vulnerability is a present quality of persons with former schizophrenia diagnoses (Torgalsbøen & Rund, 2010). As cited in, Ciompi and collaborators, the 11 world studies have shown high recovery rates (Ciompi et al., 2010) that supports the view of traits and processes of vulnerability. Zubin and Spring defined vulnerability as an enduring personality trait which makes an empirical probability that the individual will experience an episode of mental disorder. On the basis of diverse findings Zubin and Spring noted that the good premorbid patient often returns to his formerly good adjustment whereas the poor premorbid patient often returns to his poor

adjustment (Zubin & Spring, 1977). The coherences between the processes with the environment and traits for vulnerability are described in figure 1.

1.2 Resilience and schizophrenia

Disease and vulnerability has been a focus in general mental health (Campbell-Sills, Cohan, & Stein, 2006) and schizophrenia (Torgalsbøen, 2011). Too only have a focus on disease and vulnerability is a one-sided focus, focusing on positive adaption; resilience, is needed to make delicate distinctions (Torgersen & Waaktaar, 2012) which can prosper a differentiated picture of different illnesses. Adverse experience may also foster subsequent with resilience, with resulting advantages for mental health and well-being (Seery, Holman, & Silver, 2010). Traits and processes which enables these relations, have been vastly understudied compared to disease and vulnerability (Campbell-Sills et al., 2006), to study these relations are therefore suggested to be important in the field of schizophrenia as it can contribute to a richer picture on what prosper recovery. To differentiate the illness from the personality and find positive attributes, with the help of treatment, have been found awarding for persons with a schizophrenia diagnosis (Torgalsbøen, 2012b). The persons with a former schizophrenia diagnosis have here described the importance of processes and personal abilities which prospered a hope for a valuable future. Rustøen and collaborators (2003) have found that an individual's subjective view of health is a more important predictor of hope, than the presence of chronic disease itself (Rustøen et al., 2003)), to investigate if this relation is present in schizophrenia would be interesting.

1.2.1 The construct of resilience

In the mid 1950's researchers discovered that there are big individual differences in how well persons adjusts after experiencing the same type of adversity. It was the understanding of this phenomena that put focus on the children that adjusted well, instead on focusing on maladaptive adjustment. The concept of resilience emerged (Bekkhus, 2012). Luthar, Cicchetti, & Becker (2000) summarized the resilience research since the early 1990s, and found that the focus of resilience research has shifted away from identifying protective factors to understanding the process through which individuals overcome the adversities they experience (Luthar, Cicchetti, & Becker, 2000). There are many definitions of the phenomena and Dr. George Vaillant summarized the concept of resilience well in 1993: *"*We all know

perfectly well what resilience means until we listen to someone else try to define it." Drs. Steven and Sybil Wolin noted in 1994 that "Perhaps resilient children are, in the words of Dr. Norman Garmezy, "the keepers of the dream," our best hope for learning how to use the lessons of the past to help ourselves in the present." (Juvenilecouncil, 1999a, 1999b)

Resilience is described as a personality trait, a dynamic process and an outcome (Fletcher & Sarkar, 2013). Windle (2011) noted that an important debate emerging from the literature concerns the conceptualisation of resilience as either a trait or a process (Windle, 2011). The word resilience originates from the Latin verb *"resiliere"*, or to *"leap back"*. The term resilience has roots in mathematics and physics. As cited in Fletcher and Sarkar (2013), Lazarus (1993) cited the example of elasticity in metals, with a resilient metal bending and bouncing back (instead of breaking) when stressed. Most definitions of psychological resilience emphasize both adversity and positive adaption. (Fletcher & Sarkar, 2013). Borge (2007) makes a distinction between resilience and resilient. Resilient refers to what is in the person, whereas resilience is about complex interaction between the person and environments with adversity. Resiliency is an expression used to describe the phenomena of children developing a more secure and confident personality because they acquire social experiences which enhance the positive attributes of the child (Borge, 2007). Resiliency can be viewed as an outcome of a resilience process with the use of social relations, whereas resilient may refer to an underlying personality trait. Transferred to schizophrenia in adults, different persons with schizophrenia can have lesser or richer degrees of resilient traits. The adversity and managing this with a positive outcome as the result refers to resilience, where richer resilient persons make better use of their traits and the support provided. Resiliency is obtained when the person has made use of his or her attributes and overcomes adversity; they have acquired techniques that make them confident that they can handle obstacles in the future. Borge (2007) emphasizes that the expression *"bouncing back"* can give a false impression of resilience, it is rather a quality to be able to come back to a level of homeostasis than a phenomena that happens just once (Borge, 2010). Resilience conceptualised as traits, enable the individuals to adapt to the circumstances they encounter (Connor & Davidson, 2003; Sarkar & Fletcher, 2014), whereas the process conceptualisation recognizes that it is a capacity that develops over time, in the context of person-environment interactions (Egeland, Carlson, & Sroufe, 1993; Sarkar & Fletcher, 2014) Resiliency includes a quality of an outcome, whereas resilience processes and traits interacting with each other in a continuously manner, is suggested to be called experienced resilience.

The four waves of resilience

It has been four waves in the understanding and conceptualisation of resilience. The first wave identified resilient qualities in the individual and in the systems around, to predict social and personal success. The second wave emphasized the processes of coping with stressors, adversities, change or opportunity in a manner that resulted in identification and enrichment of protective factors (Richardson, 2002). A model containing outcomes of resilient reintegration (e.g. higher levels of homeostasis), reintegration back to comfort zones or reintegration with loss was made (Richardson, Neiger, Jensen, & Kumpfer, 1990). The third wave had a focus on identifying motivational forces within the individuals and groups, and the creation of experience that foster the activation and utilization of these forces. This wave helped clients discover and apply the force that drives a person toward self-actualization and to resiliently reintegrate from disruptions (Richardson, 2002). Masten and Obradovic (2006) have identified a fourth wave of resilience, where there is offered an intriguing possibilities for a deeper understanding of how processes work within and across levels to understand resilience (Masten & Obradović, 2006). As cited in Bekkhus (2012), Rutter (2007) emphasizes that an individual can be resilient to a given factor or a given outcome, but not to others (Bekkhus, 2012). Some situations might be more challenging for some individuals even though their degree of resilience is high, the obstacles at hand may be too big and despite resilience factors, the individual does not overcome the adversity at hand. Transferred to schizophrenia, individuals with schizophrenia might be high on resilient traits but do not overcome the adversity of the psychosis, and maintain low levels of homeostasis. Persons with schizophrenia might overcome the diagnosis itself, but may suffer of low levels of homeostasis hence other adversities such as depression and anxiety in the long term. Life situations with diverse adversities make it difficult to isolate the impact associated with any single event, especially over a lifetime with many adversities. Life situations with adversities may enable cumulative effects, as the person can be resilient to one adversity and not to others (Seery, Holman, & Silver, 2010), and if an adversity is occurring when less resilience is experienced, negative cumulative processes are suggested to have a heightened chance to occur. Schizophrenia is a diagnosis correlated with diverse adversities; violence, drug abuse, anxiety, depression, high levels of expressed emotions etc. (Hersen et al., 2007; MacMillan et al., 1986), an ability to experience resilience (Torgalsbøen, 2011) and get out of challenging life-courses is suggested to be important for recovery. Resilience refers to a quality to be able to return to a level of homeostasis and can be defined through internal criteria of

psychological wellbeing (Fletcher & Sarkar, 2013; Masten, 2001); this quality is suggested to be enabled by traits in the person (Masten, 2001). Persons with high degrees of experienced resilience, with a schizophrenia diagnosis, returns to a level of psychological homeostasis after some time have passed. The degrees of resilient traits to the persons are affected by the adversity the persons meet and it is suggested that the resilient traits get affected by the environment (Bonanno, 2004). Resilience is suggested to be a concept containing of both traits and processes (Sarkar & Fletcher, 2014). High degrees of resilient traits are suggested to be favorable for new situations of adversities (Fletcher & Sarkar, 2013). As resilience is conceptualised as processes between the person and the environment (Luthar et al., 2000), and processes within the person (Masten, 2001), the product of these relations is suggested to be named experienced resilience, enabled by both traits and processes. The third wave of resilience made two postulates. "Postulate 1: A source for actuating resilience comes from one's ecosystem. Postulate 2: Resilience is a capacity in every soul" (Richardson, 2002, pp. 314 - 315). These postulates remind researchers and clinicians about the processes in which the individuals take part in (Richardson, 2002), and activate ethical discussions regarding dividing participants in to groups of resilient and non-resilient. This thesis has taken these considerations in to its form and is investigating these relations. The fourth wave has an integrated promise to overturn some long-held assumptions of early work on resilience, particularly on the plasticity of adaptive functioning itself. It is suggested that fundamental adaptive systems that develop within the individual, once thought to be enduring attributes, may be "reprogrammable" to a degree unimagined by the pioneers in resilience (Masten & Obradović, 2006). These shifts in the resilience research enable hope and might prosper interesting research questions.

1.2.2 Resilience in schizophrenia

Torgalsbøen (2012) found that recovered persons with a former schizophrenia diagnosis had significantly higher resilience scores and significantly lower symptoms scores than participants in remission. Those who had a sustained recovery also reported optimism and willpower as being significant factors in their recovery. These results provided insight in to the possibility of resilience as a predictor for symptom remission and recovery (Torgalsbøen, 2012b). Torgalsbøen and Rund found a correlation between traits of optimism, willpower, resilience and recovery from schizophrenia (Torgalsbøen & Rund, 2010). These findings raised the important question of whether this state of mind was intrinsic to the participant and

aided in the improvement from the illness or if it was fostered by the recovery (Torgalsbøen, 2012b). Another question from these findings is if these individuals had taken part in richer resilience processes and therefore enhanced their degree of experienced resilience, or if these relations are hence resilience processes within the individual made possible by attributes of the person, or both. Hansen and Thomassen (2010) found that perceived degree of resilience measured with the the Connor-Davidson Resilience Scale is considerably lower in this group of persons with schizophrenia than what has been found in the general population and also below what has been found in a group of outpatients suffering from other mental illnesses. Scores of hope, measured with the Hertz Hope Index, were found to be slightly below the mean in the general population. Self-efficacy scores in the patient group, measured with the General Self-Efficacy Scale, were found to be scarcely below the mean in the general population (Hansen & Thomassen, 2010). These scales measure internal criteria of perceived psychological well-being through different constructs such as perceived good relations, hope and self-efficacy. This experienced resilience reflects psychological well-being in schizophrenia, as suggested by Andresen and collaborators (Andresen et al., 2003), so adding these scales together is suggested to reflect levels of psychological well-being that are considered important for persons with a schizophrenia spectrum diagnosis. It is theorized that the lowered level of resilience reflects the adversity of psychosis, and that this level would be higher in a premorbid state of the illness. It could also be the case that these lowered levels of experienced resilience are a quality of personality structures in persons who are prone to developing schizophrenia. These relations are not known and have not been investigated previously. Because these levels are measured after a period of adversity, it is suggested that these levels reflects the processes within the person and the processes with the environment; experienced resilience, enabled by the adversity and situation of having a schizophrenia diagnosis.

Resilience traits encompassing different outcomes

Masten and collaborators have defined resilience as "[a] class of phenomena characterized by good outcomes in spite of serious threats to adaption or development" (Masten, 2001, p. 228). Another definition of resilience is "[a] dynamic process encompassing positive adaption within the context of significant adversity" (Luthar et al., 2000, p. 543). Masten (2001) emphasizes characteristics within the person and attributes of the environment to be important for the outcome, whereas Luthar (2000) emphasizes the dynamic processes between the

individual and the environment as important for the outcome (Luthar et al., 2000; Masten, 2001). The trait-centered model of resilience emphasizes "mental processes and behavior" that adapt to the circumstances they encounter, whereas understanding resilience processes recognizes that it is "a capacity that develops over time and in the context of person-environment interactions" (Connor & Davidson, 2003; Egeland et al., 1993; Sarkar & Fletcher, 2014). Luthar further states: "Implicit within this notion are two critical conditions: (1) exposure to significant threat or severe adversity; and (2) the achievement of positive adaption despite major assaults on the developmental process" (Luthar et al., 2000, p. 543). In schizophrenia, both psychosis and being diagnosed with a serious mental illness are defined as a threat to the person (Torgalsbøen, 2012a). The stigmatization many patients with the diagnosis experience can also be seen as a threat to the person (van Zelst, 2009; Zubin & Spring, 1977). Two outcomes of resilience are suggested: either a higher level or an equal level of psychological homeostasis (Richardson et al., 1990) as compared to levels before the adversity. Positive adaption in schizophrenia is suggested to be shown when the person has good self-esteem and he or she might think that the experience of the illness has enabled them to be the confident person they have learned to be, or if they have found a sense of self despite the illness (Andresen et al., 2003; Torgalsbøen, 2012a; Torgalsbøen & Rund, 2010); this view emphasizes internal criteria of psychological well-being. Seery, Holman and Silver (2010) found that people with a history of some lifetime adversity reported better mental-health and well-being outcomes than people with no such history. It is suggested that exposure to moderate adversity can mobilize previously untapped resources which can provide a sense of mastery for future (Seery et al., 2010), allowing the person to thrive. This suggestion can be transferred to schizophrenia, as managing such a serious mental illness may lead to a subjective feeling of mastering hard obstacles. When a more resilient individual with schizophrenia meets adversity a positive outcome might be enabled. Masten (2001) noted that resilience emerges from ordinary processes, a view that makes the construct of resilience more available. Resilience may be altered more easily than if it was an unusual phenomena, and it can be assessed through positive psychology emphasizing natural processes within the person (Masten, 2001). The presence of adversity or stressors (Sarkar & Fletcher, 2014), makes the person able to tap in to his or her resilient traits. Emphasizing that resilience emerges from ordinary processes within the person makes the characteristics of the person and the interaction of those characteristics with the environment important. The resilient traits of the person are accessed in relation to the adversity at hand. Resilient traits are affected by the individual's resources and his or her interaction with the environment, enabling higher or

lower levels of experienced resilience. The more or lesser dynamic process of resilience enabled by both the environment and the person may affect the resilient traits (Bonanno, 2012), which is theorized to foster higher or lower levels of experienced resilience for the individual.

The positive outcome

"Individuals are not considered resilient if there has never been a significant threat to their development (…) this status or condition is statistically associated with higher probability of a «bad» outcome in the future"(Masten, 2001, p. 228). Schizophrenia is associated with a "bad" outcome in the short term for many patients, even though longitudinal research shows a more positive outcome. As cited in Hersen and collaborators (2007), several studies have shown that between 20% to 25 % of patients diagnosed with schizophrenia become fully recovered (Hersen et al., 2007). As cited in Larsen and Buss (2008), studies on happiness conclude that success in different areas in life is correlated with happiness (Larsen & Buss, 2008). Because full recovery in schizophrenia includes social and professional functioning (Torgalsbøen, Mohn, & Rishovd Rund, 2014), absence of full recovery is associated with a bad outcome when it comes to life satisfaction: "The second judgment involved in an inference about resilience is the criteria by which the quality of adaption or developmental outcome is assessed or evaluated as 'good' or 'OK'" (Masten, 2001, p. 228). Recovery is normally characterized by a temporary period of psychopathology followed by a temporary period of healthy levels of functioning, whereas resilience refers to the ability of individuals to maintain normal levels of functioning (Bonanno, 2004). Symptom remission is characterized by absence of symptoms or minimum levels of symptoms in schizophrenia (Kay et al., 1987). "Normal levels of functioning" can either be defined as internal criteria of well-being, as external criteria of functioning or both, and is often defined relative to the culture (Masten, 2001). An illustration of the distinction between resilience and recovery is that bereaved persons who demonstrate the recovery pattern may exhibit symptoms of depression and having difficulties completing normal daily tasks over a one to two-year period (Mancini & Bonanno, 2009). "In contrast, individuals who exhibit resilience seem to be able to proceed with their lives with minimal or no apparent disruptions in their daily functioning (when bereaved)" (Fletcher & Sarkar, 2013, p. 16). Here resilience is defined as the role of mental processes and behavior in promoting personal assets and protecting an individual from the potential negative effects of stressors (Fletcher & Sarkar, 2013). Resilience may be defined

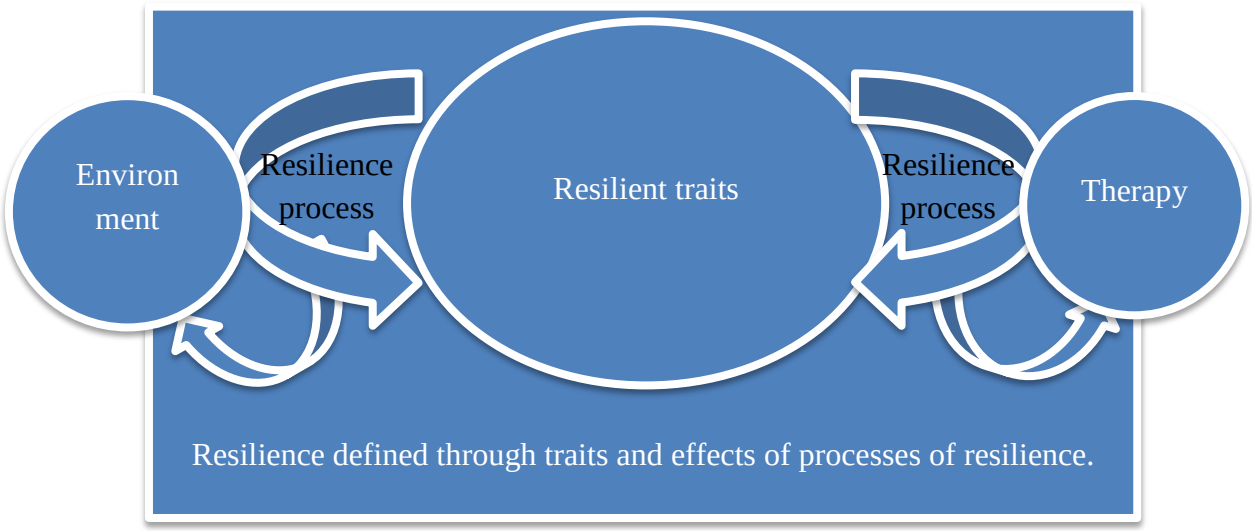
through both an absence or minimum of psychopathology and in the presence of academic and social achievement. Resilience can be defined as both of these being present; this definition emphasizes external criteria. Adaption through internal criteria emphasizes psychological well-being or low levels of distress; some researchers emphasize both (Masten, 2001). In academic studies schizophrenia, resilience is suggested to be defined as a positive outcome according to an internal criterion of psychological well-being. Personal characteristics such as social competence and self-efficacy are suggested to be important in resilience in the field of schizophrenia studies (Torgalsbøen, 2012a). A more resilient person diagnosed with schizophrenia can be understood as an individual who returns to his or her normal levels of psychological well-being despite a recent onset of the illness. It is how the person perceives himself or herself (Sarkar & Fletcher, 2014), and his or her relation to the environment and the situation that is important. Different criteria of psychological well-being are suggested to be important in resilience: stress-coping (Connor & Davidson, 2003), integrated performance under stress (Luthar et al., 2000), positive emotions, self-efficacy, spirituality, self-esteem (Fletcher & Sarkar, 2013), hope, social competence (Torgalsbøen, 2012a), optimism (Torgalsbøen & Rund, 2010) less symptomatology, effective mechanisms for avoiding unpleasant feelings when in adversity, avoidance of negative life-situations (Torgersen & Waaktaar, 2012).

What about the processes between the individual and environment?

Resiliency refers to a good outcome with help of social support when experiencing adversity (Borge, 2010). Luthar (2006) emphasizes that strong relations can work as protective factors and more resilient persons make better use of these because they perceive these relations as good (Luthar, 2006). What characterizes resilient children is not necessarily the capacity within the child, but rather the relations the child has to others (Bekkhus, 2012). Transferring this to schizophrenia, it is the perceived view of social relations and social competence by the individual that is important when emphasizing the traits in the person. A non-resilient person can get a lot of support but does not have the impression of this, and consequently does not make use of it in the same way if needed. In this understanding, a resilient person has a perceived view of support from others; actual support is not always necessary. Nonetheless, if a person with schizophrenia finds himself or herself in an environment which is hostile to schizophrenia (van Zelst, 2009; Zubin & Spring, 1977), it is harder for the person to make use of his or her degree of resilient traits. As cited in Torgalsbøen (2012), one study showed that

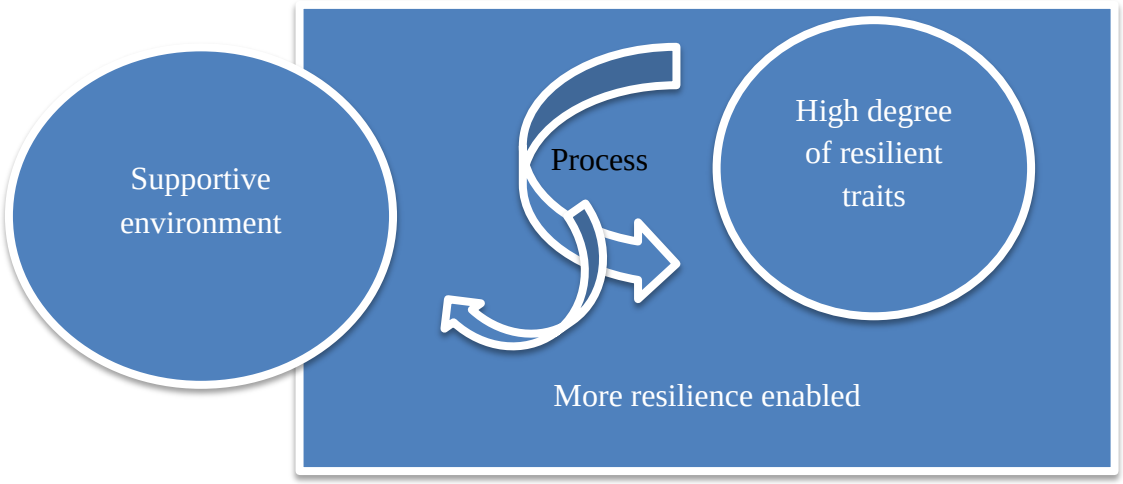
patients with schizophrenia who were fully recovered and had been in longer psychotherapeutic treatment showed a better social functioning than other fully recovered patients (Torgalsbøen, 2001, 2012a). This might indicate that more resilient persons wanted to attend psychotherapeutic treatment because they viewed this as rewarding, which in turn enhanced their social competence.

Figure 2: Resilient traits affect and are affected by resilience processes between the person and the environment.



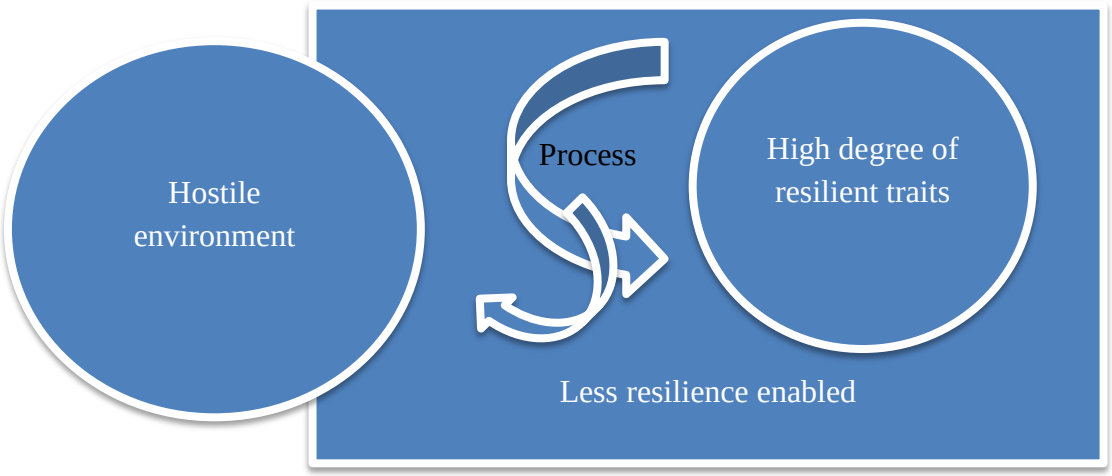
Environments with support enable more resilience as there is more opportunity for the person to make use of the belief in other relations. A good alliance between the therapist and the patient with schizophrenia, for example, is suggested to be important (Hagen, 2011; Torgalsbøen, 2012a). Experienced resilience in schizophrenia is therefore defined as the interactions between degrees of resilient traits and the resilience processes between the individual and the environment. The complex processes of resilience enabled by both the resilient traits and the interactions between the environment, the person and therapy, are described in Figure 2. If these individuals had not been presented for therapy and been in highly hostile environments with stigmatization of schizophrenia present, it is theorized that less resilience would have been enabled regardless of high degrees of resilient traits within the person. The resilience processes within the person are dependent on meeting resilience processes in the environment for a higher level of experienced resilience to take place.

Figure 3: A resilient person in a supportive environment



Different environments with lesser or greater degrees of stigmatization may enable different outcomes of experienced resilience. Richer degrees of experienced resilience may be enabled in supportive environments as described in Figure 3.

Figure 4: A resilient person in a hostile environment.



If persons with schizophrenia are in highly hostile environments with stigmatization of schizophrenia present, it is theorized that less experienced resilience would have been enabled regardless of high degrees of resilient traits within the person, as described in Figure 4.

To summarize, the outcome of resilience in schizophrenia is a positive outcome in internal criteria of psychological well-being. Either an outcome where the premorbid levels of psychological well-being is integrated, or where a higher level of psychological well-being is attained. The personality traits of the person are emphasized as processes within the individual interacts with the environment. These inner processes are affected and affect the

resilience processes between the person and the environment. Supportive environments enable more experienced resilience, whereas hostile environments enable less experienced resilience.

The resilient personality structure in schizophrenia

Torgersen and Waaktaar summarized different types of resilient personalities found in the resilience literature. One resilient personality type, which is often suggested in the psychology literature, the "complicated type" exhibits high degrees of neuroticism, extraversion and consciousness, traits taken out of the Giant Three (Torgersen & Waaktaar, 2012) in the Eysenckian system (Ng, Cooper, & Chandler, 1998). This is a personality structure, which can be transferred to schizophrenia, that allows individual to find their way through life despite emotional difficulties (Torgersen & Waaktaar, 2012). Resilience can be found in the stable Big Five personality dimensions (Torgersen & Waaktaar, 2012): neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Personality traits are found to be relative stabile entities and reflect a tendency in the individual (Costa & McCrae, 1988). Piedmont summarized the traits and facets in the revised NEO personality inventory invented by Costa and McCrae (1992). The facet of positive emotions in the trait of extraversion "reflects a tendency to experience positive emotions such as joy, happiness, love and excitement. (…) They are seen as cheerful, high-spirited, joyful, and optimistic" (Piedmont, 1998, p. 87). Happiness and life satisfaction are found to be related to neuroticism and extraversion in general (Piedmont, 1998) and are found to be related to resilience in mental health (Torgersen & Waaktaar, 2012). High levels of neuroticism are correlated with mental illness, including schizophrenia, and high levels of extraversion are correlated with positive emotions and psychological well-being (Piedmont, 1998). Traits influencing perceived social support, hopes for the future and self-efficacy are suggested to be important for resilience in schizophrenia (Andresen et al., 2003). The trait of extraversion in the Big Five covers similar concepts and is important for resilience in schizophrenia. Traits of resilience are found to be reproducible and stable in research (Torgersen & Waaktaar, 2012). As cited in Torgalsbøen and Rund (2010), Wolin and Wolin (1993) defined resilience to include "several protective attributes, such as insight, independence, relationships, initiative, creativity, humour, and morality" (Torgalsbøen & Rund, 2010, p. 80). The authors suggested these attributes to be important in schizophrenia. Resilient traits enable a higher possibility for individuals to adapt to circumstances that they encounter (Connor & Davidson, 2003; Sarkar & Fletcher, 2014).

Personality variables are found to fluctuate more in childhood than in adulthood, but even though personality is more stabilised in adulthood, it is not impervious to situational and environmental influences (McCrae et al., 2000). Resilience in particular is somewhat different than other types of personality traits as it contains an adversity, which might inform the measures of resilience and even the personality (Bonanno, 2012). In the vast majority of studies of personality and resilience in adults, the personality variables were measured after the adversity. Given the finding that personality get affected by situations and environments, especially when measurements of resilience often are taken months after the adversity (Bonanno & Mancini, 2008), it is entirely as plausible that the experience of adversity may inform the personality variable rather than the other way around (Bonanno & Diminich, 2013) and processes might get measured. The term "resilience processes" describes a capacity that develops over time in the context of person-environment interactions (Egeland et al., 1993; Sarkar & Fletcher, 2014). The process and situation view, and the fact that most resilience research is conducted after the adversity call into question the construct of resilience conceptualised as only a trait.

Resilience strategies

Fletcher and Sarkar made a distinction between coping and resilience which both can lead to handling adversities and accessing social support. Resilience influences how an event is appraised whereas coping refers to the strategies employed following the appraisal of a stressful event. Resilience provokes a positive response (e.g. positive emotions) to a stressful situation, whereas coping strategies may be positive (e.g. encouraging self-dialogue) or negative (e.g. substance abuse). Highly resilient persons often also exhibit effective coping strategies (Fletcher & Sarkar, 2013). An illustration of a resilience strategy is individuals operating in a demanding performance environment on a daily basis who would be deemed to exhibit resilience if they evaluated stressors as an opportunity for development and consequently received peer recognition for their work. By contrast, if individuals operating in a similar environment did not react positively and their work suffered and they then sought social support from their colleagues, this would be an example of coping (Fletcher & Sarkar, 2013). Transferred to schizophrenia, seeking social support in crisis might be an example of coping if the demands at hand are not viewed as an opportunity for development. Techniques that do not take into account hopes for the future, but rather adjust hopes may be enabled. Techniques lowering the levels of symptoms (e.g medication) which lead to improving the

illness but does not take in consideration the person's beliefs and hopes may be enabled. The capacity to be proactive in the choice of supportive relations and the perceived view of such social support is viewed to be important, as opposed to how often support is searched for. A more resilient person with a schizophrenia diagnosis would not easily give up his or her beliefs and hopes for the future, and would try to seek help where such views are shared. Richardson (2002) and collaborators (1990) developed a resiliency model (Richardson, 2002; Richardson et al., 1990) in which resilience starts when a person is in balance physically, mentally and spiritually. Disruption from this state occurs if an individual has insufficient resources to buffer him or her against stressors, adversities or life events. In time, the individual will adjust and begin the reintegration process (Fletcher & Sarkar, 2013). As cited in Fletcher and Sarkar, the model of Richardson (2002) and collaborators (1990), suggests that the reintegration process leads to one of four outcomes: "resilient reintegration (where disruption leads to attainment of additional protective factors and a new, higher level of homeostasis); homeostatic reintegration (where disruption leads to people remaining in their comfort zones, in an effort to "just get past" the disruption); reintegration with loss (where disruption leads to the loss of protective factors and a new, lower level of homeostasis); and dysfunctional reintegration (where disruption leads to people resorting to destructive behaviors such as substance abuse) (Fletcher & Sarkar, 2013, p. 17). Here, resilience traits have been assessed and different outcomes are enabled with varying degrees of resilience. A possible reason for why one can find resilient persons who do not overcome their illness can be that manifested symptoms (for example a strong belief that one is Jesus) do not fit well with recovery from the illness. Resilience may lead to remission from symptoms, but may also lead to non-remission if the person has acquired a higher level of homeostasis that does not fit well with recovery from the illness. The strategy of coping can be a way of becoming symptom-free; the person just makes use of the resources at hand to become symptom-free without being proactive in the choice of relations (e.g. not choosing relations where hopes for the person's future are shared). This strategy can lead to symptom reduction and in this way get the focus back on the resilience processes. A person with schizophrenia can be in symptom remission but have no job or social contacts (Torgalsbøen, 2011); if the person finds this situation rewarding he or she can be classified as resilient and experiencing resilience. If the person does not find this situation rewarding, the person is not defined as resilient when internal criteria are emphasized. In the following section, a process of resilient or homeostatic reintegration for schizophrenia is described, where a process of experienced resilience is enabled when the highly resilient person meets the adversity of schizophrenia.

Experienced resilience enabling a positive outcome in schizophrenia

The concept of recovery in schizophrenia started gaining importance in the 1980s when former clients of mental health published accounts of their recovery from serious mental illness. Andresen, Oades and Caputi (2003) reviewed this literature and found a new definition of psychological recovery based on their research. Here recovery is described through hope and self-determination, leading to a meaningful life and a positive sense of self, whether or not mental illness is still present. The researchers reviewed literature on the recovery process from schizophrenia and recapitulated five stages in this process. Moratorium, which is the first stage, is characterized by denial, confusion, hopelessness, identity confusion and self-protective withdrawal. Awareness takes place when the person has a first glimmer of hope of a better life, and that recovery is possible. This involves an awareness of a possible self, other than the "sick person": a self that is capable of recovery. The third stage, preparation, takes place when the person resolves to start working on recovering. This stage involves taking stock of the intact self, and one's values, strengths and weaknesses. It involves learning about mental illness and services available, learning recovery skills, becoming involved in groups and connecting with peers. Rebuilding, the fourth stage, consists of working to forge a positive identity. This is where the hard work of recovery takes place, it involves setting and working towards personally valued goals, and may involve reassessing old goals and values. Here the person takes responsibility for managing the illness and taking control of one's life. This stage involves taking risks, suffering setbacks and coming back to try again. Growth is the final stage, and can be considered as the outcome of the recovery process. The person may not be free of symptoms completely, but knows how to manage the illness and to stay well. Here resilience is shown in the face of setbacks, the person has faith in his or her ability to pull through and maintain a positive outlook. The person has a full and meaningful life, and looks forward to the future. He or she has a positive sense of self, feeling that the experience has made them a confident person (Andresen, Oades, & Caputi, 2003). The person experiencing schizophrenia has acquired techniques which enable him or her to have a conception of self and feelings of psychological well-being despite the current situation. The last stage in the model of Andresen and collaborators., growth, suggests that resilience is shown in the face of new setbacks (Andresen et al., 2003). The person has faith in his or her ability to pull through and maintain a positive outlook. The person has a positive sense of self and feels that the experience has might been a part of making them the confident person they have become (Torgalsbøen, 2012a). The persons who

have published their own accounts of their recovery processes are thought to have a higher degree of resilient traits and have been able to take part in richer resilience processes with the environment, enabling them to have a higher degree of experienced resilience.

Processes of resilience affecting the resilient traits of the persons

Luthar emphasizes the dynamic processes between the person and the environment in the conceptualisation of resilience (Luthar et al., 2000). These processes are defined in schizophrenia as effects from the interactions between the person with schizophrenia and supportive or hostile environments (van Zelst, 2009; Zubin & Spring, 1977). These processes are defined in schizophrenia as role functioning, social functioning (Torgalsbøen et al., 2014), daily functioning (Hansen & Thomassen, 2010), medication (Malt et al., 2003), contact with health care, therapists and received psychoeducation (Torgalsbøen, 2011), a good alliance between the therapist and the patient (Hagen, 2011; Torgalsbøen, 2012a), substance abuse (Melle & Ringen, 2011), life events (Bonanno, 2012; Torgalsbøen & Rund, 2010), HIV/AIDS (Gottesman & Groome, 1997) levels of violence (Hersen et al., 2007) levels of expressed emotions in the family and environment (MacMillan et al., 1986), and support from family and close relations (Lindvåg & Fjell, 2011). Other relations that can play a part are: shifting attitudes and ideologies of the culture, mass media, health services, social welfare services, legal services, socio-historical conditions (e.g. patterning of environmental events and transitions over the life course), school, education, church groups, neighborhood play area, neighbors, peers, gender, age and health (Bronfenbrenner, 1992; Gardiner, Mutter, & Kosmitzki, 1998; Hess & Schultz, 2008), sexual orientation, nationality and ethnicity. All these processes are hard to control for in a big picture, but as these processes take place in time (Egeland et al., 1993; Fletcher & Sarkar, 2013; Gardiner et al., 1998), dynamic processes between the individual and the environment may be operationalized as effects of time.

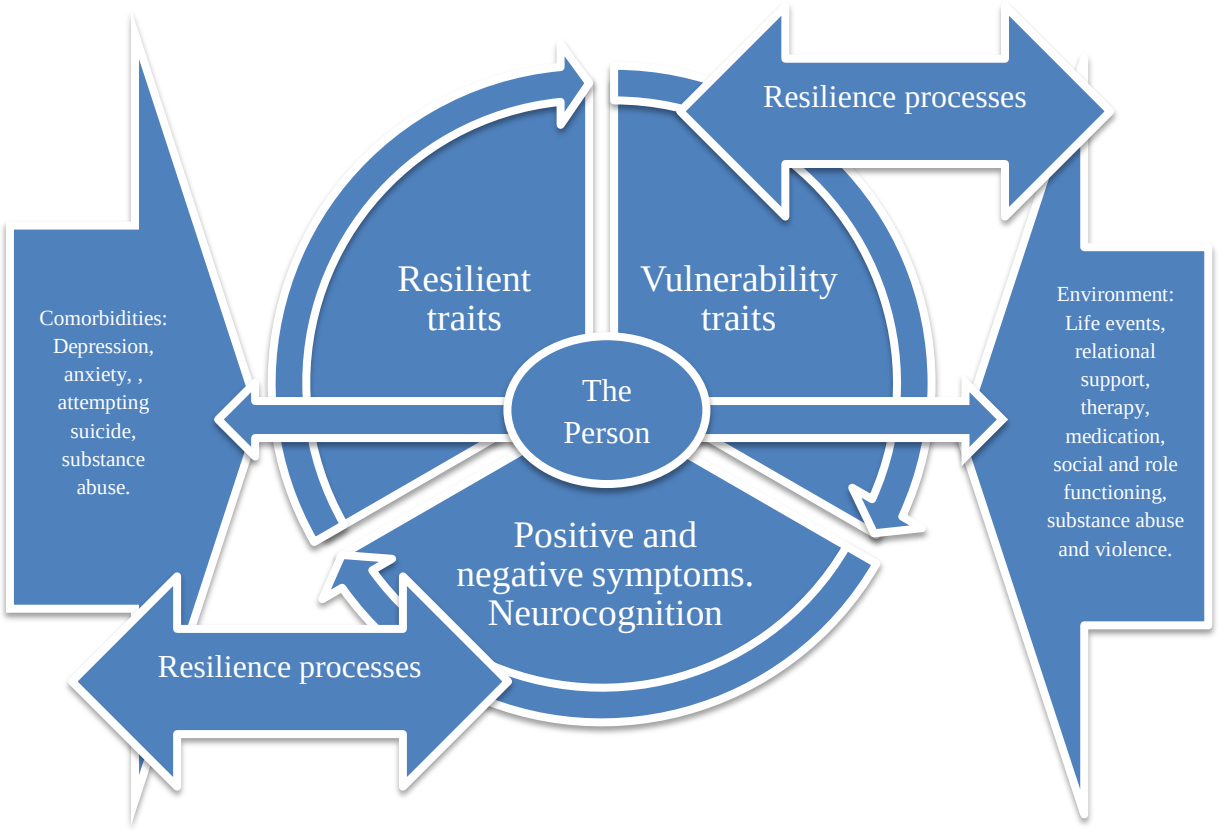
1.2.3 Experienced resilience in schizophrenia

Personal characteristics of resilience interact with the adversity of schizophrenia and the environment, creating a process of resilience between the environment and the person. Psychological well-being is the outcome, as defined through a perceived view of positive relations, enhanced self-esteem, self-belief and hopes for the future. This outcome is dependent on and gets influenced by type of environment the person with schizophrenia meets. The degrees of resilient traits in interaction with the degrees of resilience processes

between the environment and the person make resilience possible as a positive outcome of psychological well-being (Andresen et al., 2003; Luthar et al., 2000; Masten, 2001). The product of these relationships is here suggested to be named experienced resilience, enabled both by degree of resilient traits though processes within the persons and degree of resilience processes, between the environment and the person. Experienced resilience is suggested to be understood as a continuous process which affects and gets affected by traits of the person and relations between the person and the environment.

1.2.4 Resilience, vulnerability and symptom remission.

Figure 5: The complex relationships between degrees of resilience, vulnerability and symptoms within the schizophrenia spectrum. These interactions affect and are affected by the environment in resilience processes.



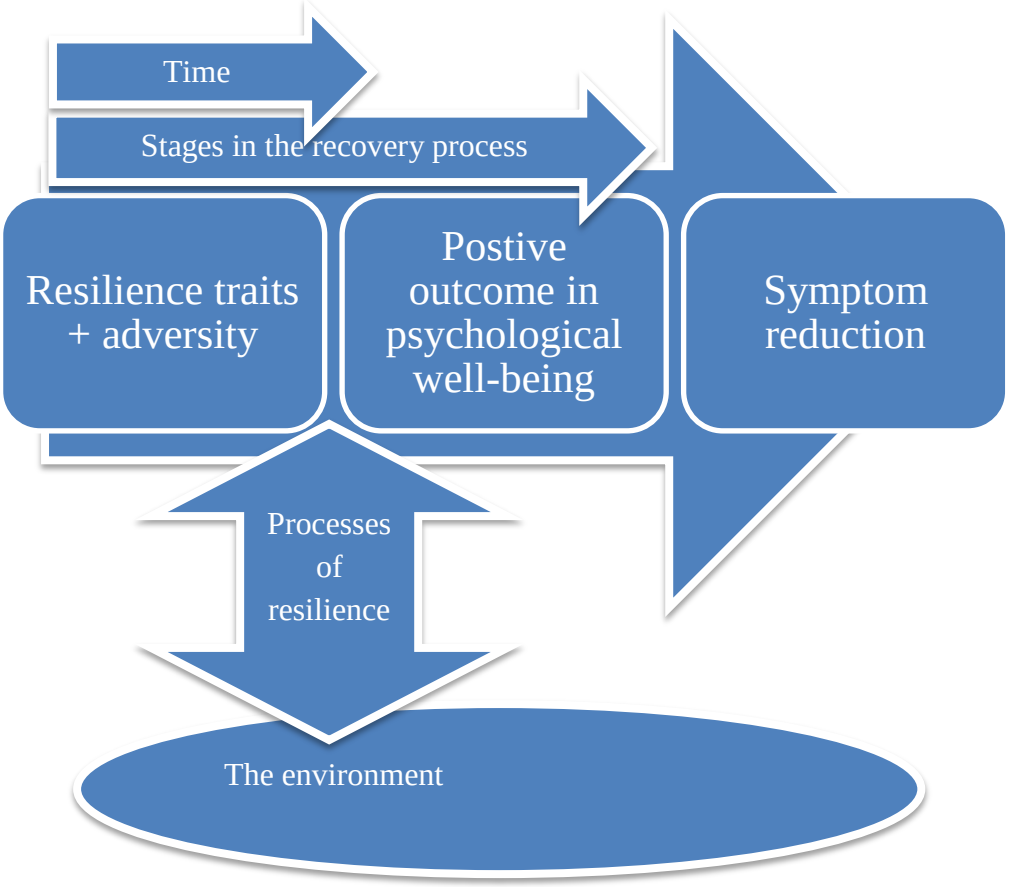
Luthar and collaborators emphasize that resilience is a dynamic process which encompasses positive adaptation in a context of significant adversity. (Luthar et al., 2000) Rutter has described some of the dynamic in the process of resilience, noting "if circumstances change, resilience alters" (Fletcher & Sarkar, 2013, p. 15; Rutter, 1987). Zubin and collaborators describe schizophrenia in itself as something changeable and dynamic when introducing vulnerability as a continuous trait that is present in persons with schizophrenia (Zubin & Spring, 1977). A result from these findings may be that vulnerability traits and resilience traits

intervene between the environment and other attributes of the person. These complex coherences can have an impact on the outcome of symptom remission and full recovery from schizophrenia. The complex and dynamic interactions and processes within the person and between the person and the environment, which leads to symptom remission in schizophrenia are described in Figure 5.

Overcoming the illness of schizophrenia is understood as recovery despite major assaults on the developmental process from the threat of the psychosis. Symptom remission is understood as having a minimum of negative and positive symptoms (Kay et al., 1987). Resilience through a higher level of psychological well-being or a "bounced back" premorbid level of psychological homeostasis is viewed as achievement of positive adaptation despite the adversity presented by the schizophrenia. Symptom remission and full recovery from schizophrenia is not equal to resilience. An evaluation regarding the person's experience of quality of life is necessary when encompassing internal criteria of psychological well-being in resilience. As cited in Larsen and Buss (2008), Diener, Lucas & Larsen (2003) have found that people's emotional lives and the judgment of how satisfied they are with their lives are highly correlated (Larsen & Buss, 2008). This relation is suggested to be present in patients with schizophrenia, even though degree of insight might be lower in this group (McEvoy et al., 1989). People who have high degrees of pleasant emotions in their lives tend to judge their lives as satisfying, and vice versa. As cited in Larsen and Buss (2008), Lyubomirsky and collaborators (2005) found that longitudinal studies provide evidence that happiness is prior to many positive outcomes in many areas in life (Larsen & Buss, 2008). Resilience, which is somewhat similar to happiness and psychological well-being when defined through internal criteria, may work in the same way. Psychological well-being may lead to many positive outcomes in different areas of life. As cited in Larsen and Buss (2008), Sandvik, Diener and Seidlitz (1993) found that persons who report that they are happy tend to have friends and family members who agree that they are (Larsen & Buss, 2008). Even though degree of insight is found to be lower in persons with schizophrenia (McEvoy et al., 1989), perceived psychological well-being of the person is suggested to be reported likewise by persons around the person. A person is suggested to know best his or her degree of psychological well-being himself or herself (Larsen & Buss, 2008), as it is the person that experiences the quality of life. It is possible to be fully recovered from schizophrenia but to have a "broken" self-esteem and not look at the experience from schizophrenia as something that has contributed to life experience. A highly resilient person bounces back in self-esteem whereas a less resilient

person might suffer from symptoms of depression and lowered self-esteem in the aftermath of psychosis and may look at the experience as something that he or she would rather be without. The degrees of resilience experienced are enabled by both the processes within the persons and by the processes between supportive or hostile environments and the person.

Figure 6: Resilience traits enabling a positive outcome in psychological well-being, which is suggested to foster symptom reduction in the aftermath of an onset of schizophrenia.



This thesis emphasizes internal criteria of psychological well-being and perceived social support. High levels of these characteristics are present in the person, through experienced resilience, despite the difficult situation the person finds him- or herself in. It is theorized that these high levels of homeostasis can lead to symptom remission. Persons showing resilience are considered as being positively adapted regarding psychological well-being despite adversities at hand. A resilient person who experiences schizophrenia might encounter situations where their vulnerabilities are affected, but it does not affect the person in the same way as in the less resilient person. He or she has acquired techniques that make him or her able to either understand the symptoms or manage them in a way where hope is maintained. A fully recovered person who is not defined as having high resilience might be in a stable

environment and does not necessarily need these attributes as such an environment does not produce the same amount of stressors which can cause positive or negative symptoms (van Zelst, 2009; Zubin & Spring, 1977). The more resilient person views the situation with hope and self-belief, whereas the less resilient person does not have this view to the same extent. The less resilient person is suggested to be more dependent on good periods of being symptom-free to have a positive view on life. The more resilient person is not as affected by the current adversity as the person who has low levels of resilience. As earlier noted, Seery, Holman, and Silver (2010) recently found that people with a history of some lifetime adversity reported outcome of better mental health and well-being than people with no history of adversity (Fletcher & Sarkar, 2013; Seery et al., 2010). Silver's study might indicate that going through a process of adversity is something that can actually contribute well to a better life. Positive adaptation is shown when the person has a good self-esteem and he or she might think that the experience of the illness has made them a confident person (Torgalsbøen, 2012a). Adversity promotes psychological well-being in the more resilient person because the person gets to know new sides of him- or herself that he or she would not have known without this experience. These sides of the person and the experience of success with adversity may bring new perspectives to life and foster psychological well-being. The outcome of resilience is obtained when the individual has acquired a process assessing degrees of resilient traits relevant to the adversity of schizophrenia and has a positive outcome in internal criteria for psychological well-being.

In sum, it is suggested that the more resilient a person with schizophrenia is, the higher probability he or she has for coming into richer resilience processes. The consequence of resilient traits and resilience processes are higher or lower degrees of experienced resilience, defined through psychological well-being. More resilient persons in richer resilience processes with the environment experiences more resilience as a consequence. The quality of "bouncing back" of resilience is suggested to be important for handling and minimalizing the symptoms of schizophrenia, as described in Figure 6.

1.3 Purpose of the present study

Developing a comprehensive understanding of resilience across the lifespan is important for mental health, yet resilience has been vastly understudied compared to disease and vulnerability (Campbell-Sills, Cohan, & Stein, 2006). Earlier research has suggested a relationship between resilience and remission from schizophrenia (Torgalsbøen, 2012b; Torgalsbøen & Rund, 2010). The concept of resilience in schizophrenia is clinically relevant because it can have an impact on treatment types that assesses degrees of resilience, which can contribute to psychological wellbeing. High levels of psychological well-being are associated with life satisfaction (Larsen & Buss, 2008) which users of mental health services find important (Andresen et al., 2003). Research on patients with serious mental illnesses suggest that a positive outcome in psychological well-being can contribute to symptom remission and full recovery for patients with schizophrenia (Andresen et al., 2003). Investigation of the predictive value of resilience, defined through psychological well-being. has not been systematically researched before in the field of schizophrenia (Hansen & Thomassen, 2010). Research analysing the relationship between resilience and symptom remission is therefore important, as symptom remission is a measure used to describe psychological functioning in mental health (DSMPsychiatryOnline, 2014; Organization, 1993). Such research can therefore have an impact on the type of treatment given.

In this thesis we address three research questions:

1. Is there a relationship between degrees of experienced resilience and symptom remission in schizophrenia at 2-year follow-up?

2. Is experienced resilience in schizophrenia a concept involving both resilient traits and resilience processes between the individual and the environment?

3. Are degrees of experienced resilience a predictor for symptom remission in schizophrenia?

2 Methods

This thesis is part of a larger ongoing research project at the Department of Psychology, University of Oslo, with Associate Professor Anne-Kari Torgalsbøen as the principal investigator. The research project is a prospective longitudinal study on first-episode schizophrenia patients that examines neurocognition and resilience as possible predictors of recovery during the early, and late course of the illness. The research project investigates the stability and rate of full recovery during a 10-year follow-up, using consensus based definitions of remission and full recovery in schizophrenia (Torgalsbøen et al., 2014). Written informed consent is obtained, and the recruiting of participants and routines for the gathering of data has been approved by the Regional Committee for Medical Research Ethics in Region South (REK).

2.1 Subjects

Over a period of four years (2007-2011) 28 patients with first-episode schizophrenia were referred to the study. They were recruited from Vestre Viken Health Trust and Lovisenberg Diakonale Hospital. All participants could read and write Norwegian fluently and were of the ages of 18 years and upwards. The participants were diagnosed using the Structural Clinical Interview for DSM-IV (SCID) (American Psychiatric Assoaciation, 1994) by their referring therapists; all participants had a diagnosis within the schizophrenia spectrum at inclusion. Criteria for exclusion were affective disorder, IQ below 70 and brain damage. The control group consisted of healthy controls that were matched pairwise with the patient-group on important demographic variables such as gender, age and partly on education.

At 2-year follow-up, three subjects had dropped out of the study. Due to the nature of statistical analysis, only subjects who were assessed at all follow-up points (baseline, six-month, one- and two-year) are included in this thesis. This leaves 25 participants for the final analyses. For demographic and clinical characteristics for the 25 participants, see Table 1.

Table 1: Demographic and clinical characteristics for the participants (*N*=25)

		Mean	SD	Range
Age		21.1	2.6	18-27
Years of education		13.0	1.9	10-18
Months of untreated psychosis		16.1	16.2	1-60
			Frequency	**Percent**
Gender	**Female**		11	44.0
	Male		14	56.0
Level of education	**Secondary school**		9	36.0
	Upper comprehensive school		9	36.0
	Started higher education		6	24.0
	Bachelor degree		0	0.0
	Master degree		1	4.0
Type of diagnosis	**Schizophrenia**		17	68.0
	Schizoaffective disorder		6	24.0
	Psychosis – unspecified type		2	8.0
Treatment status	**Hospitalized**		16	64.0
	Outpatient		9	36.0
Antipsychotic medication	**Baseline**		24/24	100.0
	6-month follow-up		22/23	95.7
	1-year follow-up		18/18	100.0
	2-year follow-up		18/22	81.8

2.2 Clinical instruments

The clinical interviews and tests of the participants were done within the first five months of their admission to hospital or out-patient clinic, and were carried out by an experienced clinical psychologist. Diagnoses were established using the Structural Clinical Instrument of Diagnosis for DSM-IV Axis I disorders (SCID-I), modules A-D. The degrees of psychopathology were measured with The Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987; Torgalsbøen et al., 2014).

2.2.1 Resilience assessment

To assess resilience, the Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003) is chosen. The CD-RISC is a 25-item scale that measures underlying traits in the person (Connor & Davidson, 2003) and is often used to measure resilience. This scale is translated into Norwegian and has demonstrated sound psychometric properties and distinguishes between persons with greater and lesser resilience. The scale comprises 25 items, each rated on a 5-point scale (0 – 4) with higher scores reflecting greater resilience. In addition, the Generalized Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995) and the Herth Hope Index (HHI) (Herth, 1992) are used. The GSE is based on Bandura's conceptualisation of self-efficacy, and assesses self-perceptions regarding one's ability to successfully perform a behavior, and reflects an optimistic self-belief (Schwarzer & Jerusalem, 1995). Expectancies of self-efficacy have been shown to exert influence on the ability to initiate and persist in behavior. This scale is translated into Norwegian, showing high reliability. The scale consists of 10 items rated on a 4-point Likert scale. The Herth Hope Index is translated into Norwegian and measures the level of general hopefulness of adults in clinical settings. The scale consists of 12 items, each rated on a 4-point Likert scale that ranges from strongly agree to strongly disagree. The measures of resilience traits are operationalized in this thesis by adding these scores together based on the theory that resilience contains the constructs underlying these scales.

How to measure the underlying resilience construct

Connor and collaborators (2003) found that their resilience scale could be modified by treatment in mental illness such as General Anxiety Disorder (GAD) (Connor & Davidson, 2003). It is theorized that situations and other mental illnesses can also affect resilience

measures. Patients diagnosed within the schizophrenia spectrum often develop anxiety and depression in the short term (Hersen et al., 2007), which may affect the resilience scores at each time point. The person might be depressed, have high levels of anxiety, have high levels of positive and/or negative symptoms within the schizophrenia spectrum or be in a situation which is theorized to be able to affect the resilience measure. More resilient persons with schizophrenia proceed through this adversity with somewhat intact levels of psychological well-being. This happens despite the current situation and the experience with the illness after a short time; in this thesis, this time is operationalized to be over one year. The participants can experience less resilience at certain test points, but can, over a longer time-period, show high resilience despite the given situation at each test point. Aggregation is to measure the average over many situations. The person-situation debate concluded that aggregation is the best measure of personality as "behavior can be situationally specific at the item level and cross-situationally general at the aggregate level" (Epstein & O'Brien, 1985, p. 513). In other words, measuring at one occasion gives a better understanding of the situation the person finds himself or herself in at the time of assessment and does not necessarily assess the underlying personality traits. By aggregating, phenomena such as depression and anxiety are taken into account. Aggregation measures the resilience traits better, and the scores are less affected by the person's situation at the time of measurement. However, the processes the individuals find themselves in are thought to affect the scores as the scores may shift from situation to situation. Experienced resilience is defined as a combination of processes and traits; because these relations are hard to investigate, the measures for personality are used in resilience research (Bonanno, 2012). Because resilience is assessed after the adversity, it is difficult to conclude if resilience should be conceptualised as either a trait or a process (Bonanno, 2012). Aggregation takes away the focus away from the situation, and it is therefore theorized that the focus is more on processes and traits. Processes happen in time and are the effect of interactions between a person and his or her environment; they are therefore operationalized as effects of time on the scores. The stability and coherence of traits and processes are suggested to be found through correlating different assessment points of resilience.

As presented in the introduction, resilience is defined in this thesis as including psychological constructs of perceived hope for the future, perceived self-efficacy and perceived social support. The items in HHI, GSE and CD-RISC measure similar constructs and are used to measure resilience in this thesis. Questions concerned with hope regarding the future, faith,

and self-efficacy and questions concerned with perceived view of social support are emphasized using these scales. Luthar (2000) emphasizes relations as important in resilience and this aspect is taken into account by the scales (Luthar et al., 2000). The HHI has individual items for feelings of being alone and of being able to give and receive care or love (Rustøen et al., 2003). The CD-RISC has individual items regarding close and secure relationships and knowing where to turn for help (Connor & Davidson, 2003). The other items in the scales mostly cover other internal criteria such as perceived view of adapting to change, pride, faith, coping with stress and the handling of unpleasant feelings, as well as being able to recall pleasant times, having inner strength and a positive outlook towards life. The items also assess one's belief in their ability to respond to novel or difficult situations and to deal with any obstacles or setbacks (Connor & Davidson, 2003; Leganger, Kraft, & Røysamb, 2000; Rustøen et al., 2003). In sum, different items regarding psychological well-being are measured, emphasizing a positive outcome in internal criteria.

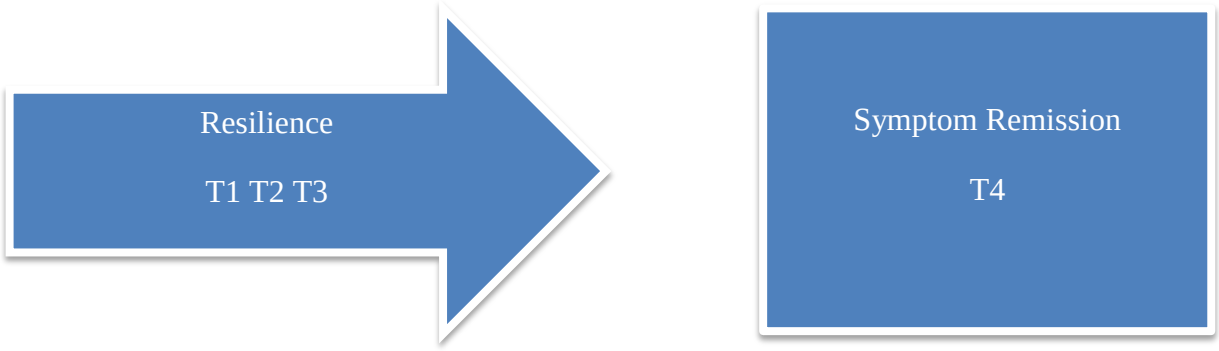
Twenty-five participants were tested at all four time-points, while three participants did not fill out the measures for CD-RISC at baseline. The average of the baseline assessment was found to be as follows: HHI had scores between 12 and 48, GSE had scores between 10 and 40 and the CD-RISC scale had scores between zero and 100. As the different indices contain scores ranging on diverse scales; therefore the scales were put in the same form by assessing standard deviation scores instead. This was done by setting the scores of the three different scales in z-scores using the computer program Predictive Analytics Software Statistic 18 for Windows (PASW). The scores at each test point were added together and divided by three to find the resilience scores for each test point. Because resilience is suggested to be conceptualised best through aggregation, the scales were aggregated over the first three time points. To find this score, the three new scores containing CD-RISC-, HHI- and GSE scores for baseline, 6-month and 1-year assessment were added together and divided by three. CD-RISC has good internal consistency, with a Cronbach alfa coefficient reported of 0.89 (n=577), for the full scale (Connor & Davidson, 2003). The other scales are also found to have good internal consistency with high Cronbach alpha coefficients (Herth, 1992; Leganger et al., 2000; Schwarzer & Jerusalem, 1995; Wahl, Rustøen, Lerdal, Hanestad, & Moum, 2004) It is theorized that these scales and the constructs measured hold their grade of validity when mixed like this.

2.2.2 Definition of symptom remission

The symptom remission criteria for schizophrenia were taken from published criteria (Andresen et al., 2003) and are assessed using The Positive and Negative Symptoms Scale (PANSS) (Kay et al., 1987). The criteria for symptom remission is based on an evaluation of eight groups of symptoms: delusions, unusual thought content, hallucinatory behavior, conceptual disorganisation, mannerisms and posturing, blunted affect, social and emotional withdrawal, and lack of spontaneity. The score of these items must be mild or less than three (< 3), using the 1–7 range of each item with a duration of six months as a minimum threshold (Kay et al., 1987). The dependent variable of symptom remission is categorical, dividing the participants into two groups of "in remission" and "non-remission." PANSS has a good internal consistency, with a Cronbach alpha coefficient reported of .79 for the full scale (*N*=101) (Kay et al., 1987).

2.3 Design and data analyses

Figure 7: Design of the study.



The aim of this study is to uncover tendencies in a small sample. All statistical analyses were performed using the computer program Predictive Analytics Software Statistic 18 for Windows (PASW). Descriptive analyses were performed to map the distribution of data for resilience and symptom remission and to check for tendencies. As resilience is a continuous variable, an outlier analysis was conducted. Data from baseline assessments (T1), 6-month assessments (T2), 1-year follow-up (T3) and 2-year follow-up (T4) were measured for symptom remission and resilience. Scales for resilience are aggregated for the first year, and symptom remission is obtained with six months of minimum symptoms (< 3) and is assessed at the second year in the predicting analyses. A reliability test for aggregated resilience was

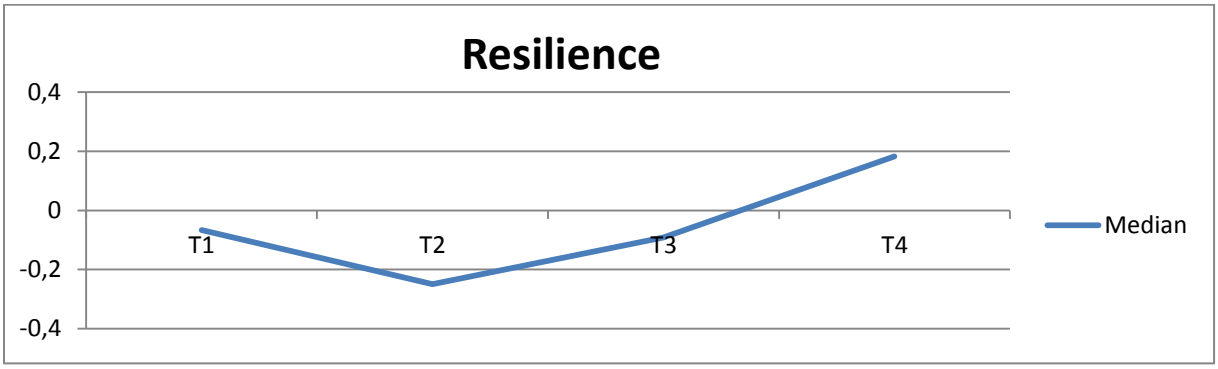
performed, putting each of the scales on the three test-points together in a reliability analysis. The Cronbach alpha coefficient had a high value of .82 (N = 25). A factor analysis to check for different factors measured by the new scale was not conducted as the N was too low. If a factor analysis had been conducted, the new scale containing all three scales might have contained more or fewer factors than the original scales. The constructs behind each of the scales may overlap, which could result in different factors from a factor analysis. It is the questions asked in the measures that are relevant, rather than the individual factors and whether these overlap. It is theorized that the resulting underlying construct of resilience, defined through internal criteria of psychological wellbeing, is measured better when mixed in this way. The design of the study is described in Figure 7.

The strength and direction of the relationship between aggregated resilience for the first year and symptom remission at 2-year follow-up was assessed by the Pearson's product-moment correlational analysis. As suggested in Pallant (2007), the outcome was interpreted by using guidelines suggested by Cohen (1988) (Pallant, 2007). The amount of shared variance ($r^{2)}$ is found from these calculations. This value represents the proportion of variance in the outcome variable that is explained, or shared, by the independent variable. Further correlations were performed to control for other associations influencing the relationship between resilience measures and measures of symptom remission. To deepen into the construct of resilience, further correlation analyses were done to investigate resilience conceptualised as traits, processes or both. Because the variables were categorical and continuous correlational analyses were conducted to investigate for tendencies and associations between different assessments (Howitt & Cramer, 2008; Pallant, 2007). To investigate the predictive value of degrees of resilience on symptom remission, logistic regression was used. This choice was made because the outcome variable for symptom remission is categorical (Howitt & Cramer, 2008; Pallant, 2007). Because of ethical considerations regarding a division between resilient and non-resilient persons, resilience is here used as a continuous variable. Further logistic regressions were conducted to control for effects of other variables, including gender, age, years of education and PANSS scores at baseline. These were conducted to investigate for tendencies and to see if these variables affect the relationship between resilience and symptom remission. As the categorical variable of symptom remission is originally a continuous variable, ANOVA could have been used (Howitt & Cramer, 2008; Pallant, 2007). However, since research and clinical practice use the division of remission and non-remission (DSMPsychiatryOnline, 2014; Organization, 1993), the analyses described are performed.

3 Results

3.1.1 Resilience

Figure 8: Mean scores for resilience at each test-point (*N* = 25)



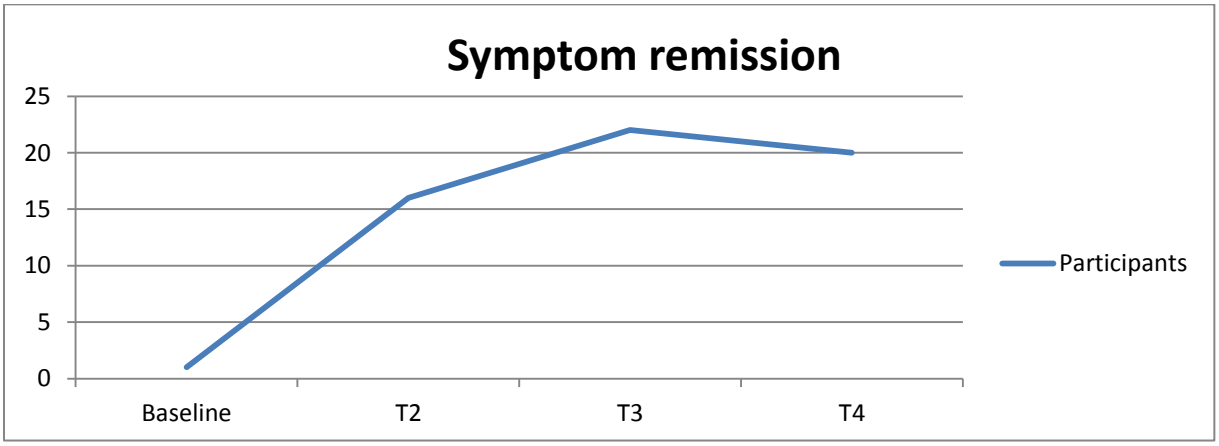
Descriptive analysis for the resilience scores at each test-point was performed. Figure 8 shows the mean scores for the group at each test point for resilience. Figure 13 in the appendix shows aggregated resilience scores for the first year measured in standard deviation for the participants applied in six different groups with varying levels of resilience. Most participants are situated around the central tendency, with a mean of -.06. A skewness number of .31 indicates that there is a lack of symmetry around the central tendency. This is caused by the fact that many participants show either a higher degree of resilience or that they are situated around the central tendency (e.g. scarcely over or under the mean). As many participants are situated scarcely below the mean, it is theorized that if another group of patients had taken part in the study, the mean would have been different and some of the less resilient persons would have been categorized as highly resilient, or vice versa. A kurtosis number of .04 reflects a steep curve which indicates that there are differences between the different resilience groups.

Statistical analyses were applied to assess the normality of the variables as many statistical techniques are sensitive to outliers. As illustrated by Figure 14 in the appendix, the normal Q–Q plot shows a reasonably straight line with no clustering of points, with most points collecting around the zero-line. This suggests a normal distribution of resilience scores within the patient group, which is also indicated by the normal shape in Figure 8. The Kolmogorov–Smirnow test of normality also indicates a normal distribution of resilience scores (p = .20) for this group. Descriptive analysis showed three scores that deviate somewhat from the

mean; one participant had a value of 1.13, the second participant had a value of 1.17 and the third participant had a negative value of -1.25. All these participants were more than one standard deviation over or below the normal; therefore an outlier analysis was conducted. The original mean and the new, trimmed mean are compared. As seen in Table 4 in the appendix section, the more extreme scores have insignificant influence on the mean and are therefore retained in the data file.

3.1.2 Symptom remission

Figure 9: Participants in remission at each test-point (*N* = 25)



At baseline one person was in symptom remission of the 25 participants included in the analyses. There was an increase of participants in remission from baseline to 6-month follow-up, with 16 persons in remission. At the 1-year follow-up, 22 persons were in remission and at the 2-year follow-up 20 participants were in remission which is a little decrease from the 1-year follow-up. A skewness number of -1.60, found from descriptive analysis, shows that there is a lack of symmetry around the central tendency at 2-year follow-up. This is caused by the fact that most participants (*n* = 20) are in symptom remission at this point. A kurtosis number of .59 reflects a steep curve which indicates that there is a clear difference between the two groups; 80% of the participants are in symptom remission. Symptom remission is a variable that is not expected to be normally distributed, so a Q-Q plot or an outlier analysis was not performed. The amount of participants in symptom remission at each test-point is described in Figure 9.

3.1.3 The strength and direction of the relationships.

The relationship between aggregated resilience over the first year and being in symptom remission at 2-year follow-up was investigated using the Pearson product-moment correlation coefficient. As shown in Table 2, there is a positive and medium-strong correlation between these two variables (r = .44, p = < .05). High levels of resilience are associated with symptom remission at the second year. Shared variance is 19.45 % which represents the proportion of variance in symptom remission that is shared or explained by resilience.

Correlation analyses to investigate the relationships between symptom remissions at different test-points were performed to check for coherences. Symptom remission at six months follow up and 1-year follow-up are associated with symptom remission at 2-year follow-up (r = [.43, .46], p < .05). To investigate for new associations between resilience and symptom remission, relationships between resilience at different time points and symptom remission at different time-points were analysed. These analyses found that resilience measured at 1-year follow-up is associated with symptom remission at 2-year follow-up (r = .41, p < .05), whereas the other relationships between assessments of symptom remission were not statistically significant (p > .05). When symptom remission measured at earlier time points was correlated with resilience measures at later stages, no significant results were found (p > .05). To investigate for associations between resilience measured at different time points, and single assessment resilience compared to aggregated resilience over one year, new analyses were conducted. All individual resilience measures were found to be strongly correlated to aggregated resilience over one year (r = [.61, .82, .82], p < .01). To investigate the relationships between single assessments of resilience and predictive ability of aggregate resilience, the resilience score of T4 was included in the correlations. The construct of resilience is still operationalized to take place during the first year, but other effects are controlled for here. The relationships between single assessments of resilience were found to be either strongly correlated when time passes (r = [.61, .58], p < .01), or non-significant and small to medium correlated after intake (r = [.19, .22], p > .05). The relationship between aggregated resilience over one year was found to be statistically significant and strongly correlated to resilience measured at 2-year follow-up (r = .52, p > .05). The correlations are given in Table 2.

Table 2: Pearson Product-Moment Correlation between resilience and symptom remission (N = 25)

Scale	**1.** SR T4	**2.** R T1toT3	**3**. SR T1	**4.** SR T2	**5.** SR T3	**6.** R T1	**7.** R T2	**8.** R T3	**9.** R T4
1. Symptom remission at T4	-								
2. Resilience measured over one year	.44*	-							
3. Symptom remission at T1	.	.	-						
4. Symptom remission at T2	.46*	.36	.	-					
5. Symptom remission at T3	.43*.	.24.	.	.24	-				
6. Resilience measured at T1	.20	.61**	.	.14	.27	-			
7. Resilience measured at T2	.37	.82**	.	.42*	.17	.22	-		
8. Resilience measured at T3	.41*	.82**	.	.26	..11	.19	.61**	-	
Resilience measured at T4	.49*	.52**	.	.29	.04	.24	.35	.58**	-

Note * $p < .05$ ** $p < .01$ SR is an abbreviation for Symptom Remission, R is an abbreviation for Resilience whereas T is an abbreviation for Time point.

3.1.4 The impact of experienced resilience on symptom remission.

In order to assess the impact of resilience on symptom remission at 2-year follow-up, direct logistic regression was performed. The model contained two variables: resilience and symptom remission. The full model was statistically significant χ^2 (2, N = 25) = 5.913 (p = .015), indicating that the model was able to distinguish between respondents who were in symptom remission and those who were not. The model as a whole explained between 21.1% (Cox & Snell R Square) and 33.3% (Nagelkerke R Square) of the variance in remission at 2-year follow-up and correctly classified 84.0% of the cases. As shown in Table 3, the independent variable of resilience made a unique statistically significant contribution to the model ($p < .05$). Resilience predicts symptom remission with an odds ratio of 13.28.

In order to control for the possible influences of other variables and to check for tendencies in the group, further direct logistic regressions with symptom remission as the dependent variable, including different predicting variables were performed. Different models with variables from baseline assessment, including gender, age, years of education and PANSS score, were performed to control for the effects these measures have on resilience. A direct logistic regression with variables of resilience, gender, age and years of education was performed; this model had no statistically significant variables. To control for effects of each of the variables separately, new analyses controlling for each of these three variables and the variable of PANSS score, in four different models were performed. These full models were found to be statistically significant and the degrees of explained variance were increased, with all models finding high odds ratios for resilience and most models finding this predictor to be statistically significant ($p < .05$). Even though it is found high odds ratios, it is also found big confidence intervals that give somewhat unsure estimates ranging in the intervals. When resilience was investigated without controlling for other variables, it was a statistical probability of 95% that the right odds ratio was between 1.04 and 169.46, which are somewhat other numbers than the original 13.28. This is found to be a tendency when controlling for other variables to. To control for tendencies, several new logistic regressions, which are not described further here, were conducted to control for effects from other variables. Variables of neurocognitive functioning, social functioning, role functioning, medication, type of schizophrenia diagnosis, type of education, and other variables were controlled for. These analyses showed a trend towards a predictive value for resilience, with statistically significant and non-statistically significant values for resilience. In Table 3, the

exact statistical significance levels for the main analyses are shown to give a clearer picture of this relation.

Table 3: Logistic regression predicting symptom remission (N = 25)

	Explained variance	Correctly classified cases		*B*	S.E.	Wald	df	*p*	Odds Ratio	95% C.I. for Odds Ratio	
										Lower	Upper
Resilience	21.1 – 33.3 %	84.0 %	**Resilience**	2.59	1.30	3.96	1	.046	13.28	1.04	169.46
Resilience – Gender Age Years of education	51.5 – 81.4 %	92.0 %	**Resilience**	5.99	5.44	1.21	1	.271	397.75	.01	16948090.37
			Gender	-23.23	9435.25	.00	1	.998	.00	.00	.
			Age	.04	.87	.00	1	.967	1.04	.19	5.68
			Years of education	.62	1.52	.17	1	.684	1.86	.09	36.81
Resilience – Gender	50.8 – 80.3 %	92.0 %	**Resilience**	8.55	5.39	2.52	1	.113	5180.69	.13	201749076.3
			Gender	-26.48	8758.03	.00	1	.998	.00	.00	.
Resilience – Age	21.4 – 33.9 %	80.0 %	**Resilience**	2.62	1.30	4.05	1	.044	13.73	1.07	175.83
			Age	.08	.23	.12	1	.734	1.08	.69	.17
Resilience – Years of education	30.2 – 47.7%	88.0 %	**Resilience**	3.03	1.48	4.17	1	.041	20.62	1.13	376.37
			Years of education	.82	.57	2.06	1	.151	2.27	.74	6.97
Resilience – Total PANSS score	34.4 – 54.3 %	80.0 %	**Resilience**	4.69	2.27	4.28	1	.039	109.08	1.28	9298.94
			Total PANSS score	.09	.05	2.80	1	.094	1.09	.99	1.21

Note Explained variance represents the Cox & Snell R Square and the Nagelkerke R Square values, which represents an indication of the amount of variation in the dependent variable explained by the model.

4 Discussion

4.1 Resilience and symptom remission in schizophrenia.

Data from this study investigates the relationship between resilience and symptom remission, if experienced resilience is a result of traits and processes, and if experienced resilience is predictive for symptom remission in schizophrenia. As presented in the introduction, previous studies have investigated whether resilience is correlated with recovery in schizophrenia (Torgalsbøen, 2012b; Torgalsbøen & Rund, 2010). Hansen and Thomassen (2010) found that degree of perceived resilience measured with the CD-RISC, degree of hope measured with the HHI and self-efficacy measured with the GSE in the patient group were below the mean in the general population (Hansen & Thomassen, 2010). The aggregated resilience for the three constructs in one has not been correlated with other groups in this thesis, but it is theorized that the normal population would have higher experienced resilience scores compared to this patient group if measured on these scales. The aim in this thesis is to measure degree of experienced resilience and whether this degree is predictive for symptom remission, not to find out who is resilient compared to a control sample. As the persons in this study would have been part of the general population before the onset of the schizophrenia diagnosis, it is theorized that the participants had higher degrees of resilience before the adversity of schizophrenia. The predictive value of experienced resilience and in-depth analyses of the resilience construct in schizophrenia is not known to have been investigated before.

4.1.1 Is there a relationship between degrees of experienced resilience and symptom remission in schizophrenia at 2-year follow up?

The relationship between resilience and symptom remission at 2-year follow-up is found to be moderately strong with a positive direction. The more resilience experienced by a person the higher is the probability that the person will be in symptom remission at 2-year follow-up. If in symptom remission at 2-year follow-up, the higher the probability is that the person had high degrees of experienced resilience over the first year. At 2-year follow-up 80% of the participants are in symptom remission and the participants are showing the highest degrees of resilience at this point. Single assessment of resilience is found to be moderately correlated

with symptom remission at 6-month follow-up and at 2-year follow-up on a statistically significant level. Resilience measured at 1-year follow-up is moderately correlated with symptom remission at 2-year follow-up. The other correlations between single assessment scores of resilience and symptom remission are not statistically significant. These results indicate that symptom remission is not always predicted by resilience when assessed at one point in time. The aggregated score of resilience over 1 year is found on these results to be a better predictor for symptom remission than just assessed at one occasion. When time passes, the number of participants in symptom remission increases, and this may influence the resilience scores at each time point. The resilience scores might be affected by being in symptom remission as well, although it is not necessarily clear in which direction. To control for this relation, symptom remission was correlated prior to single assessment of resilience at later stages, which indicated that symptom remission does not predict more resilience, hence the fact that these relations were not statistically significant. High degrees of resilience over one year foster symptom remission later on, whereas a result supporting the opposite direction is not found. As shown in Table 3 in the results section, there were found moderately strong relationships between symptom remissions measured at 6-months follow-up and 1-year follow-up compared to symptom remission at 2-year follow-up. The other correlations between symptom remissions were not found to be statistically significant. These results indicate that if a person is in symptom remission between the six-month and one-year assessments, there is a statistical probability that the person will be in symptom remission at 2-year follow-up. In other words, to be in symptom remission is a predictor for sustained symptom remission, when time passes. These results indicate that resilience is a predictor for symptom remission, which increases the probability for sustained symptom remission. The results support the relevance of resilience as predictive for symptom remission and may indicate that experienced resilience is a more latent factor, manifested as traits or a stable process, since symptom remission is not found to predict resilience. These results support and are in accordance with earlier research which has found that the individual's subjective view of health is a more important predictor of hope than the presence of chronic disease itself (Rustøen et al., 2003). As seen in Table 1 in the method section, most participants are on medication during this period. Medication is found to reduce symptoms of psychosis (Malt et al., 2003) and is thought to let the individuals focus on other things than their symptoms (Oppjordsmoen, 2011). It has also been found, however, that sustained use of medication is not necessary for recovery (Torgalsbøen & Rund, 2010). These relations may have an impact on the increasing graph of patients in symptom remission from intake to 6-month follow-up.

Medication is therefore suggested to reduce symptoms in an early stage in the illness, whereas use of medication is suggested to be able to be reduced when the person is in symptom remission. The person might not need medication later to be in symptom remission. As most of the patients are on medication throughout this period of two years, the use of medication which contributes to symptom reduction is suggested to not affect the relationship between experienced resilience and symptom remission, as medication is thought to not enter degree of underlying resilience.

These findings support the research question that degrees of experienced resilience are associated with symptom remission in schizophrenia at 2-year follow-up. It is also suggested on the basis of these results that symptom remission is not predictive for higher resilience scores; this relation is not explored any further.

4.1.2 Is experienced resilience in schizophrenia a concept involving both resilient traits and resilience processes between the individual and the environment?

To investigate whether resilience is best conceptualised as traits, processes or both, correlational analyses of resilience measured at different time-points were conducted. Single assessments were also compared to aggregate resilience, over one year. These analyses showed only strong positive relationships, indicating that if a participant shows resilience at one point there is a statistically high probability that the person will show resilience over a period of time. The relationships between baseline assessment and later assessments of resilience were found to be non-significant and weak to medium strong, indicating that the resilience traits are not stabilised during the first six months, and are more influenced by interaction with the environment. The decreasing graph of the resilience scores from baseline to 6-month follow-up represents a lowered level of psychological well-being for the whole group. As this correlation was not statistically significant, it is not a reliable predictor of how persons will score in this period. After 6-month follow-up the graph increases up to 1-year follow-up and to 2-year follow-up. The analyses showed strong positive correlations between 6-month follow-up and one 1-year follow-up, and between one 1-year follow-up and 2-year follow-up. These results and the increasing graph, represented in Figure 8 in the results section, indicate that the persons are “bouncing back” in psychological well-being and that this process has been stabilised, hence predictive values are found in this time-period. Resilience measured over one year was also found to be predictive for resilience measured at

2-year follow-up, as this relationship was found to be statistically significant. Resilience measured at one occasion is not found to be stably predictive for single-assessment of resilience later on, established through statistically significant and non-statistically significant correlations. These findings are in concordance with the theory that to aggregate is a better construct for personality than to only measure at one occasion (Epstein & O'Brien, 1985), and that resilience measured over one year is predictive for degrees of resilience at a later stage. The results indicate that to predict degree of resilience from situation to situation in the first six months in not trustworthy. Predicting resilience from situation to situation is more trustworthy after six months as the resilience construct has stabilised more and strong correlations are found. Stabilisation occurs when most participants develop symptom remission in the first six months. This suggests effects from the processes between the person and the environment play a role in experienced resilience when in non-remission, but does not play such a big part when in remission. Since single assessments of resilience are strongly correlated with aggregate resilience, measuring resilience at one occasion gives an indication of levels of experienced resilience by the individual, which gives an estimate of degrees of resilient traits of the person.

The interactions with the environment in which participants take part in the early stages of the illness are found to be important for later levels of experienced resilience. As this group of patients has been in untreated psychosis for 13.3 months, including the 3 dropouts (Torgalsbøen et al., 2014), the kind of support and treatment given and whether or not good relationships were established when taken in to health-care is suggested to be important for the outcome regarding stabilisation of resilience. It is theorized that resilience traits are not stabilised when psychosis is untreated, but this hypothesis has not been tested. Research investigating persons who are not taking part in hope-enabling processes, to see how they cope, introduce an ethical consideration. To not communicate knowledge of the possibility for a valuable life and recovery when this is known to prosper improvement is an ethically difficult act, and should therefore be considered carefully if ever done. An implication from this is suggested to be that the adversity of having positive and negative symptoms affects the stability of traits, which can indicate a quality of non-remission in schizophrenia. Since no statistically significant results were found between longer intervals of single resilience assessments, it is suggested that the traits are not fully stabilised and that the persons are affected by interactions with the environment. The graph in Figure 8 in the results section reflecting levels of psychological well-being is suggested to reflect the quality of resilience of

"bouncing back", but it might also be the case that this trend is due to chance. The graph could reflect part of a continuous increasing and decreasing graph, if investigated over a longer time-period, rather than a graph that is found to be stabilising and increasing after some time. This continuous stability/instability quality or the increasing/decreasing quality on longer time-intervals have not been investigated in the lack of data for such analyses. Because earlier research has found that the ability to bounce back is the quality of resilience, and increasing and decreasing of the graph at later stages can reflect other adversities, it is suggested that the quality of resilience is reflected in the graph in Figure 8. Regardless, single time-points of the graph may give another picture if deepened in to, and the ability to bounce back is suggested to be an ongoing process within the person in interactions with processes of the environment.

In total, these results indicate that it is difficult to predict degree of resilience from situation to situation in the six first months, but the scores become more predictive as time passes. These results indicate that measuring resilience over a period of time is a good operationalization of the resilience construct; the traits get a chance to stabilise. Since all single assessments of resilience are strongly correlated to aggregated resilience, and resilience measured over the first year is correlated with resilience at 2-year follow-up, measuring resilience at one occasion is suggested to show some predictive value for later improvement. This implicates that there is a predictive value of scores done at baseline, but this predictive value is not a good predictor for later scores. Processes of resilience are suggested to be more important when the participants are in psychosis, with more unstable resilience traits which are suggested to be more vulnerable to environmental factors. The importance of the environment declines over time, but does not disappear; therefore experienced resilience is suggested to be a result of both traits and processes between the individual and the environment.

Traits and processes enabling a positive outcome

Rutter (1987) emphasized that traits of resilience differ on how they score; the traits are themselves in a process, which reflects the quality of resilience of "bouncing back" to psychological well-being (Borge, 2007; Fletcher & Sarkar, 2013; Rutter, 1987). This quality is suggested to make persons vulnerable to factors in the environment in which they find themselves. The participants are theorized to have had measures around the same level as the normal population before the adversity, as the levels of these different scales are measured to be a bit lower than the normal population (Hansen & Thomassen, 2010). It might also be the

case that, in a premorbid state, these levels would be measured as lower than the normal population, as low levels of experienced resilience might be a part of the predictability of acquiring a schizophrenia diagnosis, and might be part of the illness. As most research into resilience measures resilience after the adversity, it is hard to conclude if the levels of psychological well-being actually "bounce back" to a premorbid level of psychological well-being and to conclude that it is only traits that are measured (Bonanno, 2012). Some of these effects are taken into account when aggregation is used, making it a better measure for traits (Epstein & O'Brien, 1985); but because the traits are measured following adversity it is theorized that the processes the individual takes part in with the environments affect these scores (Bonanno, 2012). The perspective that resilience traits are affected by processes with the environment is relevant as the graph in Figure 8 first stabilises when psychological well-being decreases, and then increases when the scores stabilise. The processes between the environment and the person are found to play a role in the first six months for stabilsation of the traits, and are found to influence the person after this point.

Processes are operationalised through effects of time as these happen in time. As noted earlier, the relationship between resilience and symptom remission grows stronger over time. The reason for this may be that traits of resilience are influenced by processes with the environment. The theory that the resilience scores are influenced by the stages in the recovery process as suggested by Andresen and collaborators (Andresen et al., 2003) may explain that the resilience scores are not constant entities. The results indicate that as time passes, resilience stabilises during the first six months and levels of psychological well-being increase after six months. Levels of psychological well-being "bounce back" which is the quality of resilience (Borge, 2007; Fletcher & Sarkar, 2013). It is theorized that some of the participants are in the stage of moratorium (Andresen et al., 2003) at intake and between baseline and at 6-month follow-up. Moratorium might negatively influence the predictive value from baseline to 6-month follow-up as this correlation is not statistically significant. At 6-month follow-up, the participants are stabilising and report less psychological well-being, as confusion of the illness has set in. In the second stage, awareness overlaps the first stage and the participants are theorized to be in this stage and stages of preparation and rebuilding during 6-month follow-up and in the next six months. In the last stage, growth is shown in the face of new setbacks. The person has faith in his or her ability to pull through and maintain a positive outlook (Andresen et al., 2003). It is theorized that some of the participants have gone through these stages in a process over one year and that the resilience traits in the

participants makes this process possible; the positive outcome in levels of psychological well-being are here the outcome in resilience. The participants have also established relationships with health-care practitioners and researchers in this project who have up to date knowledge of recovery from schizophrenia; interactions with caretakers and researchers comprise another element of the environment. High predictive values are observed between single assessments of resilience after six months, which is suggested to reflect that the traits have stabilised. This might also be indicative of stabilisation of the environment as families and friends become used to the illness over time.

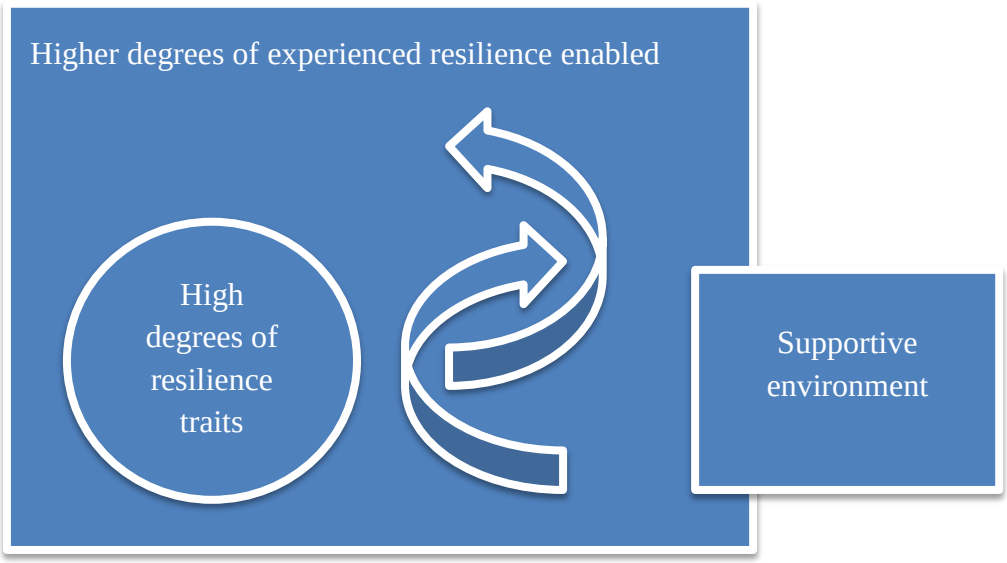
Some of the persons may have lower levels of psychological well-being, which stabilised after six months, other persons might be either homeostatic reintegrated with levels of psychological well-being similar to the levels before the adversity whereas others might have gotten higher levels of resilience (Fletcher & Sarkar, 2013; Richardson, 2002; Richardson et al., 1990), in the aftermath of the adversity the schizophrenia represents. The traits were not measured in a premorbid state of the illness, so it is hard to conclude how the participants would have scored before the onset of the illness (Bonanno, 2012) even though it is theorized that the participants would have had higher resilience scores. The participants are suggested to be affected by the onset of the illness and the situation they are in, and it is suggested that the traits have not stabilised in the period of untreated psychosis. Some patients might be engaged in more or less resilient processes enabled both by their traits and the environment prior to intake, but, as mentioned previously, these relations are not controlled for and it is therefore difficult to draw any conclusions. However, the increasing graph after 6-month follow-up reflects the quality to be able to "bounce back" (Fletcher & Sarkar, 2013), through a recovery process as suggested by Andresen and collaborators (Andresen et al., 2003) enabled by the quality of the resilience traits of the participants (Masten, 2001). As shown, the process (Luthar et al., 2000) is an important factor during the first six months and does not disappear as time passes.

Processes in the environment affecting experienced resilience

Bonanno (2012) noted that resilience is rarely measured as a trait only (Bonanno, 2012); most resilience studies measure resilience following a period of adversity, which is also the case in this study. Even though there is a theoretical suggestion that the resilience scores would have been higher before the adversity, this is not measured and therefore not known. The processes the individuals find themselves in are therefore a factor that is suggested to contribute to the

measures over the whole period. The graph is suggested to reflect the processes the participants are in, as well as underlying traits. Rutter notes that traits themselves are changeable; they are not constant entities (Rutter, 1987). Measuring resilience over many situations takes the focus away from the situation but actualises the debate between resilience measured as a trait or as a process. Nonetheless, the more resilient the person is the higher probability the person has to be engaged in processes enabling greater resilience as the more resilient persons is suggested to be proactive when choosing relations (Sarkar & Fletcher, 2014). An example of this might be that patients who underwent longer therapeutic treatment demonstrated increased social capability (Torgalsbøen, 2012a); a possible explanation for this might be that more resilient persons might have sought out situations with good relations which led to more experienced resilience through social relations. Resilience has been demonstrated to be modifiable by therapy in disorders such as General Anxiety Disorder (GAD) (Connor & Davidson, 2003; Hansen & Thomassen, 2010). Some participants are maybe in hostile environments (Ciompi et al., 2010; van Zelst, 2009; Zubin & Spring, 1977) where schizophrenia is stigmatized and availability of treatment might be the only thing that can meet their degree of hopes, perceived self-efficacy and perceived belief in social support. Patients who were more resilient (Masten, 2001) would have chosen to take part in this therapy if they found therapists who met their expectations and with who they could form a good relationship (Hagen, 2011). If such treatment was not available, and there were no other available means of support, the same processes of resilience would not take place, because resilience consists of a perceived view of supportive relationships, which implicates actual relationships.

Figure 10: High degrees of resilient traits foster higher degrees of resilience in a supportive environment.



A person's traits are influenced by the environment, and environments with more resources available foster more resilience (Luthar et al., 2000). Processes between the environment and the person are theorized and demonstrated in these results, operationalized as the effects of time, to firstly stabilise the scores and then influence them. The relationships between processes and traits for resilience which can foster more resilience are shown in Figure 10.

It is suggested on the basis of the analyses that experienced resilience in schizophrenia is a concept involving both resilient traits and resilience processes between an individual and their environment. Resilience is suggested to not be a highly stable trait, but to be influenced by processes with the environment. Processes within the persons and processes with the environment are suggested to be reflected in the resilience scores after the onset of schizophrenia. Early in the time-period of schizophrenia, resilience is a more unstable construct and is theorized to get affected by the processes with the environment. The participants are suggested to be more vulnerable to hostile environments; support received is suggested to play a bigger part in this period. After the first six months, the stability of resilience increases and levels of psychological well-being increase; this might reflect that both the traits and processes are stabilised. Scores of experienced resilience from the patient are suggested to give an indication of degrees of resilience traits and degrees of resilience processes the person takes part in. How much resilience is experienced by the person gives an estimate of levels of resilient traits of the person. An effective method of therapy might be for the therapist to tap into these resilient traits in order to foster greater psychological well-being

in the patient, because psychological well-being has value in and of itself and is found to correlate with symptom remission.

4.1.3 Are degrees of experienced resilience a predictor for symptom remission in schizophrenia?

The logistic regression with variables of experienced resilience over the first year and symptom remission measured at 2-year follow-up found that resilience is predictive for symptom remission. Participants with high levels of experienced resilience are 13 times more likely to be in symptom remission at 2-year follow-up, when controlling for no other variables. When controlling for gender, age and years of education in different models, the explained variance increased and the models were found to be statistically significant. When controlling for age and years of education in different models, resilience was found to be statistically significant and had a high odds ratio. When controlling for gender, resilience was not found to be statistically significant but had a high odds ratio. When controlling for all these variables in the same model, resilience kept its high predictive value, but the statistically significant level decreased. In order to control for how degrees of symptoms at baseline affected the relationship between resilience and symptom remission, total PANSS-score at baseline was controlled for. Controlling for PANSS, the predictive value for resilience increased, indicating that resilience is a strong predictor for symptom remission even when levels of symptoms are controlled for. Several other logistic regressions were conducted to control for tendencies from resilience. Variables of neurocognitive functioning (assessed through the MATRICS consensus cognitive battery), social role functioning, professional role functioning (Torgalsbøen et al., 2014) medication, type of schizophrenia diagnosis, type of education, and other variables were controlled for. These analyses showed a trend towards a predictive value for resilience with both statistically significant and non-statistically significant results. When many variables are taken into account in one model, the predictive value most for resilience often keeps its value while the statistically significant value for resilience often decreases to a level of non-significance. This relation suggests that the impact of experienced resilience on symptom remission decreases when the bigger picture is considered. But even these findings, resilience is shown to play a part on the way to symptom remission, as resilience even in these controlling analyses had in general higher odds ratios than the other variables. As seen in Table 3, in the method section, there is a large window in which the actual odds ratios value might be situated, with a 95% statistical probability, which

was a trend in all the analyses. Despite this consideration, the high predictive value of resilience is conserved, as several logistic regressions show a trend towards a higher predictive value for this variable compared to the other variables measured. In sum, there is a trend that participants with high degrees of experienced resilience are more likely to be in symptom remission at 2-year follow-up when other variables are controlled for,

Experienced resilience can be viewed as an indication of psychological well-being and good relations to other persons, which reflects qualitative good relations. Although these factors are hard to control for, one way to control for them would be to let the therapist, family members, friends and the participants themselves rate their relationships with one another and their psychological well-being and the psychological well-being of the patient. This would also give an indication of resilience processes between the persons and the environment, and prospered a window to investigating resilience processes in more depth. As mentioned earlier, how persons rate their own levels of psychological well-being and happiness is correlated with how other people view these levels for the individual (Larsen & Buss, 2008). Even though persons with schizophrenia can have poor insight (McEvoy et al., 1989), it is suggested that the score for experienced resilience gives a qualitative rating of actual psychological well-being and a nuanced rating of good relations.

In sum, the results and analyses indicate that experienced resilience is a stable construct which is predictive for symptom remission. These results support the research question that degrees of experienced resilience is a predictor for symptom remission at 2-year follow-up, and the effects are found to be high. These levels of experienced resilience are, as previously mentioned, found to be influenced by resilience processes during the first six months, which contributed to a stabilisation of the traits. The effect of the processes with the environment did not diminish in the next 18 months; however, during this time, the traits were found to have stabilised and been less influenced by interactions with the environment.

"Given half a chance"

The findings from the correlations and the logistic regressions both support the research questions regarding that experienced resilience is both associated and predictive for symptom remission in schizophrenia. The participants in this study were admitted at an early stage in their illness to the project with an average of 13.3 months of untreated psychosis, including drop-outs (Torgalsbøen et al., 2014). In chronically ill patients, the symptoms are often

reoccurring with relapses to the illness. The resilient traits may have enabled a homeostatic or resilient reintegration in a process with the environment, where hopes for the future and perceived views of good relations are taken into account, but the symptoms themselves have not been reduced. Less resilience might also have been enabled, with a lower degree of psychological well-being. In persons experiencing high degrees of resilience who are still in non-remission, the symptoms might have been harder to differentiate from the person (e.g. the person has a strong belief that he is Jesus and has a perceived view of having supportive relations). Because most participants are admitted at an early stage of their illness to this project, the results found can be generalised to newly diagnosed patients with schizophrenia.

It is theorized that the participants have higher degrees of resilience than persons who do not take contact with mental health care or do not accept an invitation to take part in a study emphasizing recovery. One reason why the participants are involved in this research project may be that they hold the belief that to attend such a project actually can be beneficial for their situation. Relations, through perceived support from others are a part of the resilience construct (Bekkhus, 2012; Luthar et al., 2000). Taking part in such studies is voluntary, so participants who agree to take part in research might have a higher degree of belief in the idea that support from other people is beneficial. As seen by table 1 in the method section, all participants were either in-patients or outpatients at baseline assessment; they have all participated in treatment or other relations systemised by a health-care system. The participants were taking part in processes within a health-care system which can enable more resilience if hopes and degrees of resilience were met. More resilient persons enable richer resilience processes as they chose to take part in these processes.

It is theorized that there is a placebo effect created by simply referring to a project as having a focus on "full recovery" from schizophrenia, because the implied message to patients is that full recovery is possible. The principal investigator and the testers in this project had up-to date knowledge about recovery and the concept of a meaningful life. Hope and resilience processes within the individual were therefore met (Torgalsbøen, 2011, 2012a, 2012b; Torgalsbøen & Rund, 2010) by the environment. Resilience processes are suggested to be enabled by both the patient and also the environment; through the research-team, general health-care and the family. It is theorized that since positive framing is used both in the description of the research and in communication with the participants, this is transmitted to the patients by verbal and non-verbal communication. More resilience processes are enabled than if this communication process had not taken place (Luthar et al., 2000). Thus it could be

said that the participants in this project are “given half a chance” or more (Ciompi et al., 2010). This may explain some of the high remission rates and the high retention rate found in this study which is suggested to have a cumulative effect on experienced resilience. The positive outlook on recovery is thought to be greater in this project as the knowledge regarding recovery is up to date, as research in the field of schizophrenia concludes with higher remission rates than later versions of DSM and ICD are updated with (Ciompi et al., 2010; DSMPsychiatryOnline, 2014; Hersen et al., 2007; Organization, 1993). If the participants had not taken part in this study and had instead entered a treatment system which did not have up to date knowledge of remission and recovery, the participants may have taken part in lesser resilience processes, as some of them might be dependent on care from health-care professionals, at least in the early stages of the illness. The participants in this project are given a better chance. The suggested cumulative positive effects discussed, show health-care at its best and does not contradict the validity of the research. Rather, it can explain some of the high retention and remission rates, and may also explain some of the predictive value between experienced resilience and symptom remission. To control for this effect would be ethically difficult and hard to systemise, but scientifically rewarding, considering the debate on the person versus processes.

There is also a focus on function for the participants in this project where scales for professional role function and social role function takes this in to the picture (Torgalsbøen et al., 2014). Function is found to be correlated with feelings of psychological wellbeing (Larsen & Buss, 2008), so a focus on such elements are also suggested to foster more psychological wellbeing. The participants are in a project where their views for a valuable future are shared (Torgalsbøen, 2011). This is an example of resilience traits taking part in a process of resilience enabled both by the traits and by the environment, giving positive cumulative effects. Resilient traits encompass more resilience (Masten, 2001), but the traits cannot be seen separately from the environments (van Zelst, 2009; Zubin & Spring, 1977), which can provide different kinds of support (Ciompi et al., 2010). It is theorized that the resilient participants have been proactive (Sarkar & Fletcher, 2014), and aware of whether these things are communicated, and they have therefore taken part and remained in the project, which might explain some of the low attrition rate. Some participants might be in highly hostile environments (van Zelst, 2009; Zubin & Spring, 1977), which would have enabled less resilience had they not sought treatment or joined this study. The participants also meet with the principal researcher at least once a year over the course of the year. Positive resilience

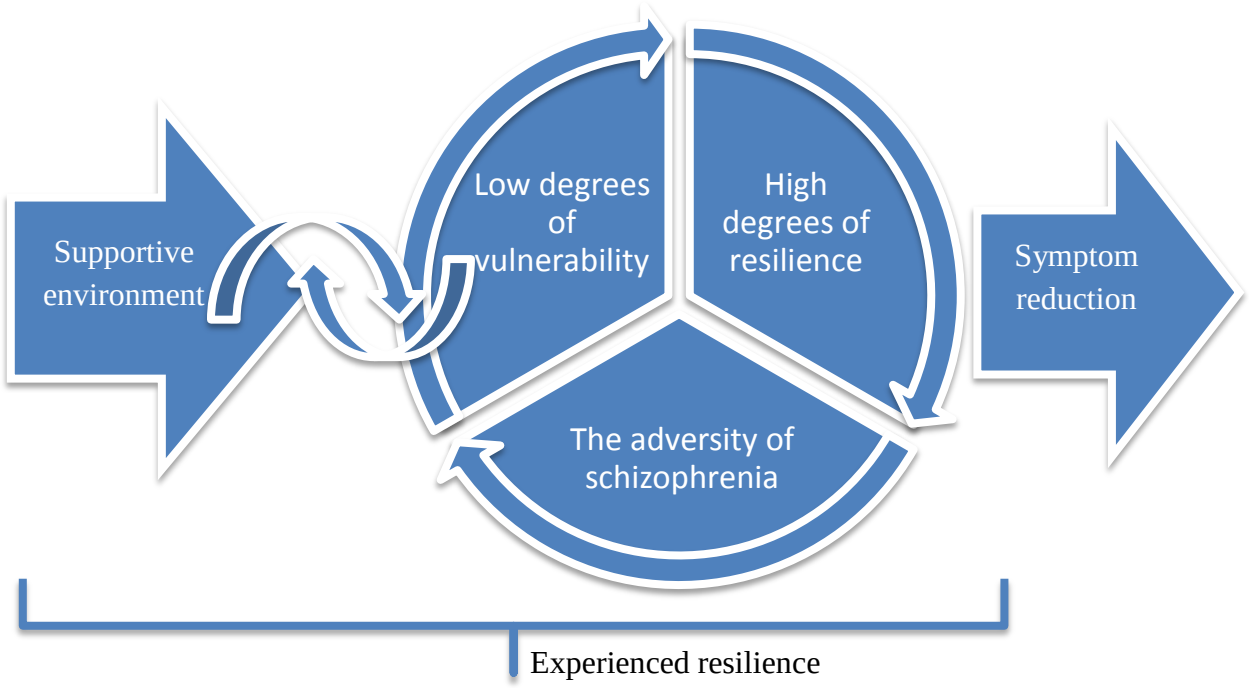
processes might be enabled by meeting with an interviewer who is familiar to the participant (Torgalsbøen, 2012b). These meetings, including testing with health-care professionals who possess updated knowledge on recovery, may actually affect the participants and the situation the persons are in (Epstein & O'Brien, 1985), and therefore affect the scores. The situation may cause the scores to be more positive as resilience processes are enabled, both by the situation and by the participants. This is suggested to have a cumulative process which enables more resilience. More resilient persons enable richer resilience processes by choosing to take part in these processes. Resilience processes are enabled by the person and by the environment, which, according to the results discussed in this thesis, reduces symptoms.

As the DSM and ICD are not updated with the latest research on the field of schizophrenia (Ciompi et al., 2010; DSMPsychiatryOnline, 2014; Hersen et al., 2007; Organization, 1993), the findings might be harder to generalize. Other institutions in other parts of mental health-care might not have the same focus on resilience and recovery and up-to date knowledge about actual recovery rates amongst patients with schizophrenia. These results can therefore be suggested to be able to generalise to health-care systems with the same amount of updated knowledge of recovery and psychological well-being. The results can be further generalised to patients with somewhat the same attributes and resources available.

4.1.4 Resilience, vulnerability and symptom remission.

It is suggested from the findings that there is a higher probability that individuals with traits of resilience, which get in to richer resilience processes with the environment, will return to the premorbid state of psychological homeostasis. Low degrees of vulnerability traits lead to a higher probability to return to a premorbid state of the illness (Zubin & Spring, 1977).

Figure 11: Factors increasing the likelihood of a positive outcome in symptom reduction.



High degrees of experienced resilience and low degrees of vulnerability are suggested to be predictive for symptom remission; interactions between these factors are shown in Figure 11. The construct of experienced resilience permits more nuanced distinctions in the understanding of the situation, processes and traits of the person, because it measures degrees and gives a richer picture of the person's current state. The environment consists of diverse variables, so even if all factors had been accounted for, the effects of the processes are hard to identify. These interactions should be measured with nuanced distinct variables as well, since life has a qualitative of being rich in meaning, and constructs measuring the absence or presence of different factors does not contain nuanced distinctions. It has not been found nuanced measures for other resilience constructs in the data-set which are needed for such analyses. Ratings of resilience by both participants and persons in the environment should then have been conducted to see how these affect each other. In the absence of such ratings and scales, effects of time are therefore defined as the conceptualisation of processes, because

processes are present in time. The results and analyses have found that traits and processes of resilience make the person more prepared for handling adversities. Experienced resilience is suggested to make the person more prepared to cope with stressors and adversities which may affect an underlying vulnerability that could facilitate relapses in the condition.

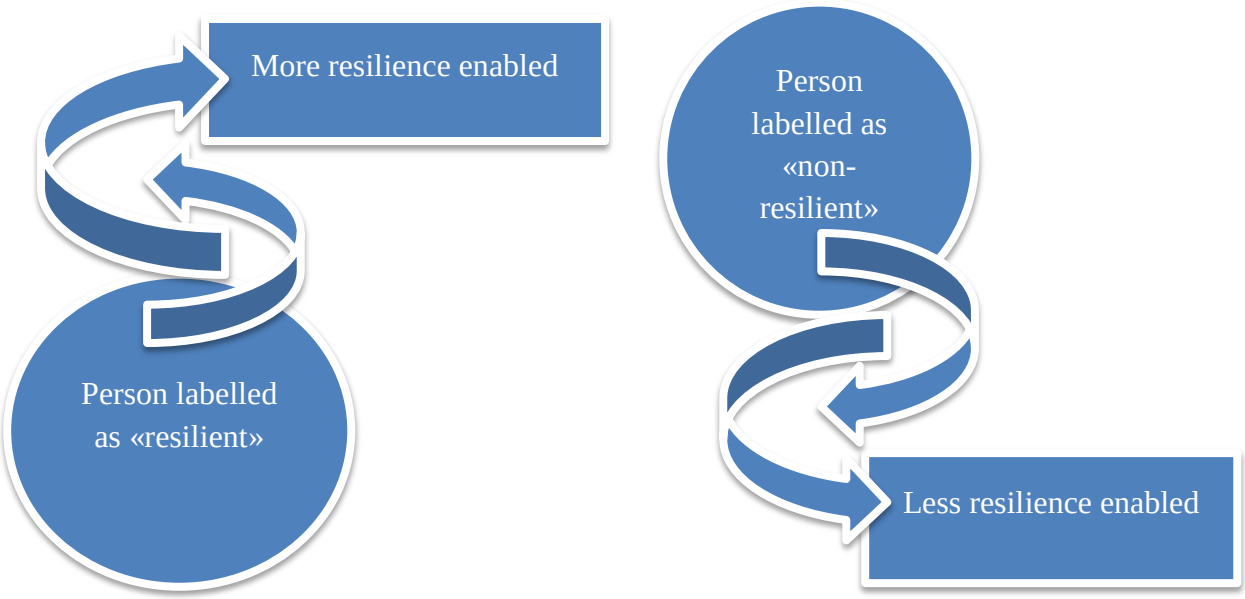
4.1.5 Self-fulfilling prophecies?

"The right of informed consent," "The right to be informed of test findings" and "The right to privacy and confidentiality" (Cohen & Swerdlik, 2010, pp. 66 - 68) were all obtained in this study. "The right for the least stigmatizing label" (Cohen & Swerdlik, 2010, p. 69) will be discussed in what follows, as this is relevant for resilience. These rights, which are manifested in laws and ethical suggestions (Cohen & Swerdlik, 2010), were taken in to consideration in this thesis and research.

"A succinct statement of resilience is that there is a force within everyone that drives them to seek self-actualization, altruism, wisdom, and harmony with a spiritual source of strength" (Richardson, 2002, p. 313) This actualizes a debate of ethical considerations in regards to dividing participants into different groups according to levels of resilience. As seen in Table 4 and Figure 13 in the appendix, there are only small differences in the mean that would separate the participants into groups of "resilient" and "non-resilient", if divided on the mean. Such a division would be interesting for further research, but because of the low number of participants, small differences in the mean, and the related ethical considerations, the participants were not divided into two groups. As mentioned earlier, the first postulate of the third wave is "a source for actuating resilience comes from one's ecosystem" (Richardson, 2002, p. 314). The results in this thesis support this important postulate. It would be hard to investigate individuals and not account for the interaction that occurs between the individual and the environment; whether this result is mostly affected by the individual or the environment is another discussion. An unwanted effect from dividing participants into groups of "resilient" and "non-resilient" may be that resilience defined through internal criteria of well-being are emphasized more in the "resilient" group. Processes of resilience are then made more easily accessible. Persons who are "non-resilient" may be treated in a different way, with less focus on the resilient traits, enabling fewer processes of resilience, which in turn can affect how the person views him or herself. This hypothesis is also in accordance with the resilience literature, which has shifted away from identifying protective factors in the individual to study the processes in which the individual participates (Fletcher & Sarkar,

2013; Luthar et al., 2000). Bonanno (2012) notes that traits of resilience are debated to be measured when resilience is measured after the adversity, it may rather be processes of resilience that then are reflected in the scores (Bonanno, 2012). Resilience is measured after the adversity in this study. This calls into question the division between the lesser and more resilient persons, perhaps reflecting instead that the persons are engaged in more or less rich resilience processes enabled by both the traits of the person and the situations they find themselves in. Focusing on resilience without having the person and his or her traits in focus might be nearly impossible, because the person is the one that interacts with the environment. Because of these considerations and on the basis of the results, this study suggests that both traits and processes are measured.

Figure 12: Self-fulfilling prophecies.



As mentioned earlier, Ciompi, Harding and Lehtinen (2010) expressed their concern regarding the pessimistic view on recovery from schizophrenia and noted that findings from 11 world studies have "shown that persons labelled with prolonged and episodic forms of schizophrenia have a strong possibility of favourable long-term outcomes if given half a chance" (Ciompi et al., 2010, p. 437). At worst, this can be a self-fulfilling prophecy for persons labelled as less-resilient patients. Patients labelled "non-resilient" may not be given the same chance. The patients who are viewed as "resilient" may benefit from being viewed as such by the treating therapist who might consequently, conscious or unconscious, enable more resilience processes to take place. Conversely, the "non-resilient" participants may be

viewed as such by their caretakers, thereby enabling fewer resilience processes. In short, less resilience is enabled in the "non-resilient" group and these persons therefore have less of a chance to take part in richer resilience processes, which can have a consequence on degree of experienced resilience. To describe resilience as a continuous variable, which reflects the true nature of the scale, instead of dividing the persons into "non-resilient" and "resilient" groups might also be more humane; all persons have both advantages and disadvantages because resilience is suggested to be a capacity within every soul (Richardson, 2002). One suggestion would be to divide participants into groups of greater and lesser degrees of resilience. Other attributes, such as cognitive functioning, professional role functioning, social role functioning (Torgalsbøen et al., 2014), social competence (Torgalsbøen, 2012a) and degrees of vulnerability (Zubin & Spring, 1977) all play a role in the process of recovery. Even though all attributes are taken in to account, the levels are merely predictive (DSMPsychiatryOnline, 2014) and do not determine future outcomes. It is important to be aware of these relations in therapy processes and in research, as different processes can be enabled which may enable different outcomes, such as more or less resilient processes. The debate regarding having vulnerability for schizophrenia versus being schizophrenic (Torgalsbøen, 2012a; Torgalsbøen & Rund, 2010) is suggested be equal to the debate of labelling patients in regards to resilience. Postulate two from the third wave of resilience summarizes this debate: "Resilience is a capacity in every soul" (Richardson, 2002, p. 313). Possible effects of labelling patients as "resilient" and "non-resilient" are described in Figure 12.

Symptom remission (Kay et al., 1987) is chosen even though the division between the remission and non-remission groups only represents small differences in levels of symptoms. It is important to protect the most vulnerable persons and have a health-care system that takes responsibility when persons are not in a state where they can take care of themselves. Because many countries in the world use DSM and ICD (DSMPsychiatryOnline, 2014; Organization, 1993) this method is chosen, as such a division is supported here.. But it is important to keep in mind that it is only small differences that differentiate the two groups, and the debate regarding what is humane is also relevant here. Vulnerability is another construct that can be used to divide participants into vulnerable and non-vulnerable and the same ethical considerations are suggested to be accounted for here.

To declare that a patient is schizophrenic may be a more deterministic and defining phrase than to describe the illness in terms of having a schizophrenia spectrum disorder. Declaring a patient to be "non-resilient" may be seen in the same way and a more humane approach might

be to talk about degrees of resilience, which can predict symptom reduction. If resilience is understood to be a capacity within every soul, it is thus suggested that talking about schizophrenia in terms of more- and less-rich resilience processes and degrees of resilient and vulnerability traits that predict episodes with relapse is a more humane way to conceptualise schizophrenia.

4.2 Limitations and strengths of this study

Small sample size

A low statistical power is inevitable with small sample sizes, and the likelihood of making an incorrect no-difference conclusion increases (Torgalsbøen, 2012b). The aim of this intensive study has been to uncover tendencies in a small patient group. It is harder to generalize from intensive studies such as this one, but when significant results are found these can nevertheless be generalized for groups that have approximately the same resources available. Because resilience is defined through the capacity to rely on relations, there is a theoretically high probability that participants with low levels of resilience on a group-level would not attend this study as they would not see help from a system as being rewarding. As suggested earlier, there can also be a placebo effect resulting from the fact that participants were recruited to join the research project; this can have an effect on the resilience scores and resilience processes enabled. The implication is that the results can be generalized to in-patients and out-patients with the same demographic variables as the subjects in this study. The high remission rate in this study might indicate that the participants have taken part in richer resilience processes enabled not only by their traits but also by the research team. The research team have up to date knowledge concerning the possibility of recovery, a focus on daily functioning, and a social and professional role (Torgalsbøen et al., 2014) in addition to sharing a belief in the value of a meaningful life (Torgalsbøen, 2012a). The participants have also taken part in general treatment from health-care professionals, and this is suggested to affect the relationship between resilience and symptom remission as well. It is difficult to control for these effects, as not giving health-care to a group of patients with schizophrenia to see how this affects them is ethically impossible. Controlling for these effects is also hard because the placebo effect is theorized to always be present when pertained to a study, and it would be hard to find good nuanced variables to control for these effects.

Unable to control for qualitative variables and variables of processes

Considering the low N and the presence of few good nuanced variables in regards to resilience measured by others than the participants, it has been hard to control for other relations. Qualitative variables and other nuanced variables have been hard to find in this project, such variables contain ratings of degrees of different constructs, including alliance between the therapist and the patient and levels of expressed emotion in the family and environment. Ideally, better nuanced data should be attained, with scales that reflect degrees of different variables, in order to differentiate the picture. As noted earlier, variables such as age, gender, years of education, and degrees of symptoms, type of education, type of schizophrenia diagnosis, medication, neurocognitive ability, social and professional role, and other variables that may affect the relationship between resilience and symptom remission, have been controlled for. Other variables that might play a role, such as biological and physiological factors, life events, racial-ethnic, familial and genetic relations (Hersen et al., 2007), type of work and kind of treatment given are not controlled for. Other variables not controlled for include shifting attitudes and ideologies of the culture, mass media, health services, social welfare services, legal services, socio-historical conditions, membership of church groups, general health, neighbourhood play area, relationships to neighbours and peers (Bronfenbrenner, 1992; Gardiner et al., 1998; Hess & Schultz, 2008)), sexual orientation and nationality. To control for the whole picture of the environment and processes another research design is needed; therefore an in-depth analysis is not conducted here. Another design containing either shorter intervals of time, or intervals over several years containing therapy would be needed to further examine the processes between the individual and the environments. The alliance between the therapist and the patient could then be assessed qualitatively and give a more nuanced picture of the processes in which the individuals participate during their treatment. In this study, these processes are operationalized through processes of time, as interactions between the individual and the environment take place over time (Egeland et al., 1993; Sarkar & Fletcher, 2014); this has given an indication that processes play a part in the resilience construct.

The course of schizophrenia is complex. Low resilience scores are thought to be affected by levels of anxiety and depression which are common comorbidities in schizophrenia (Hersen et al., 2007) , but these relationships are not controlled for in the present study. High scores for resilience can theoretically indicate an absence of depression, which affects psychological well-being (DSMPsychiatryOnline, 2014), but even so, depression does not necessarily affect

hope, perceived resilience and self-efficacy. Because manic periods are correlated with feelings of happiness and psychological well-being (DSMPsychiatryOnline, 2014; Hersen et al., 2007) the mood swings in patients with schizoaffective disorders may also contribute to the decreasing and increasing of the graph representing levels of psychological well-being. The moods of the participants at the time of assessment are theorized to affect the scores, but this effect is suggested to be evened out by aggregation. The quality of paranoid symptoms might as well be reflected in the scores as this is suggested to affect the view of other persons.

Resilience is found to be correlated with and to predict symptom remission, but when the sample size is small, there is a greater chance for accepting the hypotheses. Errors of the first kind, (e.g. when a correlation between X and Y, leads to a false rejection of the null hypothesis) might have occurred (Howitt & Cramer, 2008). There is found statistically significant results supporting a relationship and a predictive value between resilience and symptom remission, and the null hypothesis is therefore rejected .As many of the correlations are only just statistically significant, as reported in the methods section, there is a probability in the data-material that the findings are not true and that the conclusion of accepting the hypotheses is false. In this thesis, several correlations and logistic regressions with several controlling variables are conducted. It was found a trend towards that resilience is both correlated with and predictive for symptom remission, thus falsely accepting the hypotheses regarding a relationship and a predictive value of resilience is suggested to even out.

Measurement of resilience

As mentioned earlier, one possible reason for enabled resilience processes is multiple meetings with a familiar interviewer, as confidence can be promoted through familiarity (Torgalsbøen, 2012b). Meetings with testers with up-to-date knowledge regarding the importance of resilience and the possibility of recovery could play a role in symptom remission and recovery. As noted earlier, the resilience traits in this study were not measured in a premorbid state of the illness, so it is hard to draw conclusions about how participants would have scored before the onset of the illness. Bonanno (2012) noted that most research has investigated the effects of resilience after an adversity and has not measured resilience traits before the adversity; measuring resilience in this way calls into question the validity of resilience as a trait (Bonanno, 2012). However, it is difficult to measure resilience both before and after a schizophrenia diagnosis because only one per cent of the population develops a diagnosis within the schizophrenia spectrum (Andreassen & Steen, 2011). The processes

between the environment and the person are suggested to have an impact on traits and this can be reflected in scores and in the correlations with the effects of time. Through the analyses, levels of positive and negative symptoms are not found to affect experienced resilience. Experienced resilience stabilises during the first six months, which is when most participants developed symptom remission. If these relations had been investigated in a state of untreated psychosis, it might have been found that the processes and traits of experienced resilience had not stabilised. Investigation of these relations would have provided a clearer and richer picture in regards to resilience conceptualised as traits or processes in schizophrenia. The differing levels of resilience and instability of this trait might be a factor which contributes to the illness. This instability is found when the persons are not in symptom remission, and might reflect a quality of psychosis. From the analyses it is hard to make a final conclusion in regards to the debate if resilience is conceptualised as either a trait or a process, even though the correlations indicate that symptom remission does not affect experienced resilience. The analyses give support to the view that resilience is conceptualised as both traits and processes, as both of them are found present in the construct.

In regards to accepting the hypothesis if resilience is conceptualised as traits and processes, several correlations have been performed to investigate this relationship between traits and processes. These correlations have found that the stability of traits differ, they are suggested to be affected and influenced by processes with the environment. This is suggested to be made able by the processes the participants interact in with the environment, as processes are operationalized as effects of time since these processes do happen in time. The instability of resilience traits might be effected and as well be a quality of psychosis, but this relation is not deepened in to. The shifting focus of the resilience literature from identifying factors within the person (Fletcher & Sarkar, 2013; Luthar et al., 2000) and as instruments of personality are often used to measure resilience after the adversity (Bonanno, 2012) in lack of other instruments, substantiate the finding that resilience is consisting of both traits and processes. In particular, the relation that resilience is only measured after the adversity of the onset of the schizophrenia illness is suggested to even out falsely accepting the hypotheses regarding resilience conceptualised as traits and processes.

In a larger sample, a factor analysis to control for factors in the experienced resilience construct could have been performed. A factor analysis would might have shown other factors than the three measurements suggests, but it is rather the questions together in one that

is theorized to reflect the truer nature of the experienced resilience construct. Hence these considerations, the validity of the scales are suggested to keep its validity.

One possible limitation of this study is that the interviewer was not blind to the degrees of social and professional function of the participants (Torgalsbøen et al., 2014), and as premorbid levels of function are found to predict episodes with relapse (Zubin & Spring, 1977), this might lead to predictions of recovery status and symptom remission status that affect the viewing of the participants. Participants were also able to develop a familiarity with the principal researcher over multiple meeting-points, which is suggested to promote confidence (Torgalsbøen, 2012b). As noted previously, a good relationship between the principal researcher and the patients is suggested to lead to resilience processes and thereby symptom remission, as suggested by these results and analyses. These observations do not contradict the findings, but rather paint a bigger picture of a supportive environment in which individuals interacted during the study.

High retention rate and multiple assessment points

The strengths of this study include the use of well-proven instruments and sound psychometric measures (Connor & Davidson, 2003; Kay et al., 1987; Schwarzer & Jerusalem, 1995; Wahl et al., 2004), structured interviews (Torgalsbøen, 2012b) and very low attrition rate. The high retention rate makes it easier to control for multiple variables at different time-points; this strengthens the study and may contribute to statistically significant results, which can then be generalized to persons and environments with the same attributes and resources available. Important relations regarding the relationship and predictability of resilience on symptom remission and what resilience consists of are found. This contributes to a deeper understanding of the relationship between experienced resilience and levels of positive and negative symptoms. Traits and processes of resilience are found to be predictive for symptom remission, which adds nuance to current understanding of the concept of schizophrenia.

4.3 Clinical implications and future research

It is proposed that the results can be generalized to situations and health-care systems where the same amount of updated knowledge and a similarly positive outlook for the future is present, as well as to therapy processes where there is a good underlying alliance between the therapist and the patient. It is further suggested that the results may be generalized to situations and environments with the same resources, to persons with the same degrees of resilient traits and to persons who are admitted to mental health-care at an early stage, compared to persons with more chronic conditions.

Clinical implications

Because single assessments of resilience is strongly correlated to aggregated resilience, a single assessment of resilience gives an indication of resilience traits and processes, which in turn gives an indication of degrees of resilient traits of the person. An approach for clinical practice is therefore to identify processes within the person and in the environment that enable the person to take part in richer resilience processes. Identifying these resilience processes and then trying to tap into the patient's resilient qualities is suggested as a method for professional clinicians working with schizophrenia, as this resilience is found to be predictive for symptom remission. If met by an underlying good alliance with the clinician or persons in the environment, the resilient part of a person can contribute to greater psychological well-being that has a value in itself. This level of psychological well-being is found to be predictive for symptom-remission, which can lead the way to recovery from the illness. As resilience is a capacity within every soul (Richardson, 2002), it is suggested that trying to make an alliance with this part of the person with schizophrenia in order to foster more experienced resilience in both more- and less-resilient persons has a value in and of itself, because it can foster greater psychological well-being.

Future research

A possible direction for further research based on these findings would be to explore whether having positive and negative symptoms are correlated with unstable resilience traits, and whether degrees of symptoms affect degrees of resilience. Further research on interactions between resilience and vulnerability traits should also be assessed, as these interactions are suggested to affect each other and found to affect symptom remission. Other directions for

further research suggested to be by this study include research on degrees of resilient traits as predictive for symptom remission and full recovery, and research on resilience processes leading to these outcomes should be conducted, and research identifying what are these processes that foster more experienced resilience should be conducted. Additionally, investigating the effects of the environment on the stability of resilience and vulnerability traits should be conducted. Resilience has a somewhat self-fulfilling quality integrated in its construct, as adversities are always present in resilience. If adversities are taken away, the resilience construct is no longer present. Further research identifying processes in which can lead to life-courses with fewer adversities for patients with schizophrenia should therefore be conducted.

In sum, a focus on resilience processes, for example as described by individuals who have published accounts of their own recovery processes (Andresen et al., 2003), would have potentially important clinical and research implications. This is because resilience, in this thesis, is conceptualised through the description of these recovery processes, as described by the persons themselves (Andresen et al., 2003), and this resilience is found to be predictive for symptom remission. By focusing on the positive processes within the individual (Masten, 2001) and the dynamic processes between the individual and environments (Luthar et al., 2000) it may be possible to increase experienced resilience in therapy. How to enable these processes in therapy for schizophrenia is an important question for further research and in general therapy. The resilience construct consists of both adversity and positive adaption and therefore may be a limiting way of viewing an individual; in this view, if the adversities are no longer present, neither is resilience. In schizophrenia there are many comorbidities and adversities present (Hersen et al., 2007). For this reason, identifying processes which lead to experienced resilience, and identifying processes in which individuals can diminish stress and adversity in their lives are important for further research and in treatment of schizophrenia. Experienced resilience is then a helpful quality in new situations with adversities and stressors, although the adversities do not stress the person in the same way when they are no longer present in high degrees. Working with life-courses with multiple adversities implicates longer treatment courses, which is in concordance with general suggestions for therapy for persons with schizophrenia spectrum disorders. Working to increase experienced resilience is suggested to be a method which can foster more experienced resilience, is suggested to be a method in the early stages of the illness.

4.4 Conclusions

DSM-V notes in regards to schizophrenia spectrum disorders: "The predictors of course and outcome are largely unexplained, and course and outcome may not be reliably predicted" (DSMPsychiatryOnline, 2014). Comments like these show the importance of investigating correlations between recovery and various constructs that are suggested to improve recovery in schizophrenia. In order to deepen understanding of these relations, this thesis has examined the hypothesis that resilience can foster symptom remission (Torgalsbøen, 2012a).

Is there a relationship between degrees of experienced resilience and symptom remission in schizophrenia at 2-year follow-up?

Experienced resilience over one year is found to correlate with symptom remission at 2-year follow-up. Single assessments of resilience predict symptom remission later on in a few correlations, but the opposite is not found to be the case. Symptom remission is found to predict symptom remission later. The implication of these results is that experienced resilience over one year is correlated with and predictive for symptom remission, which, in turn, is predictive for sustained symptom remission. On the basis of these results, a relationship is established between resilience and symptom remission, specifically that resilience may foster symptom remission.

Is experienced resilience in schizophrenia a concept involving both resilient traits and resilience processes between the individual and the environment?

The results from this thesis show that resilience is a construct that comprises both traits and processes within persons with schizophrenia. The resilience scores stabilise during the first six months after admission to health-care in the study, and the average duration of untreated psychosis before intake is 13.3 months for the participants (Torgalsbøen et al., 2014). On this basis, it is suggested that processes within the individual and between the environment and the individual while in health care are important, especially in the first six months. Processes involving hope, good relations and enhancement of self-efficacy are suggested to enable a positive stability of traits with an increasing curve for psychological well-being from 6-month follow-up. The continuous increasing curve is found to be affected by processes with the environment as longer intervals of resilience correlations are not statistically significant. Experienced resilience appears to be a continuous phenomenon in schizophrenia. The processes with the environment are important for the stabilisation of resilience traits in the

first six months; the effect of the environment is seen to decrease after this. Because resilience is measured after the adversity (Bonanno, 2012), the processes between the environment and the person might be reflected in the whole time period of assessments, and it might be that it is the processes that have stabilised after some time. Based on these observations, experienced resilience in schizophrenia can be conceptualised as consisting of traits which both affect and are affected by processes with the environment and within the person.

Are degrees of experienced resilience a predictor for symptom remission in schizophrenia?

Aggregated resilience is found to predict symptom remission at 2-year follow-up. Even when other variables have been controlled for, resilience is found to have a high predictive value. When more than one variable is controlled for, resilience is still found to have an effect on symptom remission, but the statistically significant value decreases. The measure for resilience has nuanced distinctions, and when controlling for several other variables that are less nuanced, in one analysis, the effects from resilience decrease. It is possible that if other nuanced variables had been controlled for (e.g. controlling for resilience processes in the environment), this decreasing relation would not have been found, but as this study does not contain such variables this is not investigated. The resilience measure gives an indication of qualitatively experienced resilience for the participants, which indicate levels of support from the environment. As psychological well-being is found to be measured best by persons themselves (Larsen & Buss, 2008), it is suggested that if resilience was correlated to how persons in the environment would have scored the persons in regards to resilience, the levels of psychological well-being would correspond. In sum, experienced resilience, defined through traits and processes, are found to have a predictive value for symptom remission.

To conclude

Experienced resilience, measured over one year, is found to correlate with and predict resilience score and symptom remission at 2-year follow-up. As the resilient traits have not stabilised when many persons are still labelled as non-remission, suggests that resilience can be influenced by a supportive environment in health-care, when the persons are in non-remission in the early stages of the illness. Enhancement of experienced resilience is found to be predictive for symptom remission (an example can be through avoiding potentially detrimental labels). An important question for further research is to find out how these

processes can be enabled. It is suggested that even in severe adversity, it is possible to contribute to future benefits by increasing the propensity for resilience (Seery, 2011). On the basis of these results, it can be stated that acquiring greater degrees of resilience is important for persons with schizophrenia. To have a focus on the resilience processes within the individual and processes between the individual and the environment is suggested to be a focus for health-care professionals working with persons with schizophrenia. If resilience is recognized as a capacity existing within every soul (Richardson, 2002), such a focus can be achieved through mapping degrees of resilience in individual patients, and tapping into the resilience of each patient. A suggestion for further research and for clinicians is to identify processes which lessen adversity in schizophrenia, as schizophrenia is found to consist of multiple adversities (Hersen et al., 2007). Therapists might work towards enabling experienced resilience to be an ongoing continuous phenomenon, including processes within the person and processes between the person and the environment, as this is found to predict symptom remission. When a person reduces the amount of adversity they face in their life, the quality of resilience is less needed; however if new adversities present themselves, the person has an integrated understanding of these processes if enabled earlier on. They have then a heightened chance to make use of the "bouncing back" quality if needed and a positive psychological outcome can be enabled. On the basis of the findings in this thesis, focusing on degrees of experienced resilience in therapy for persons with schizophrenia is a method which can promote a good outcome for patients with schizophrenia, in regards to psychological well-being and symptom reduction.

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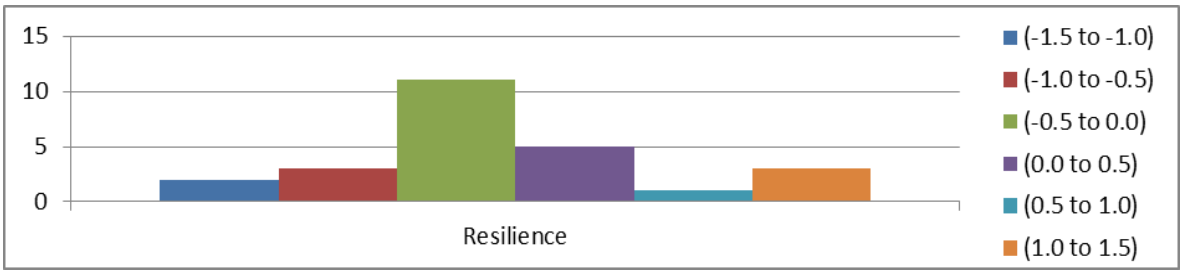
6 Appendixes

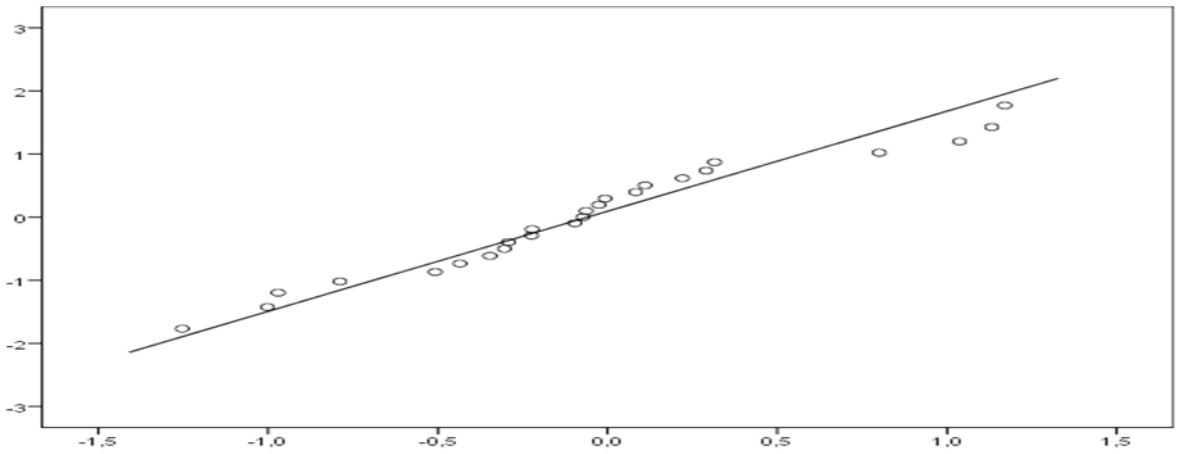
APPENDIX I

Figure 13: Distribution of the aggregated resilience scores in standard deviation for T1, T2 and T3 (*N*=25)



APPENDIX II

Figure 14: Q-Q plot for aggregated resilience *(N* = 25) Expected value (Y) * Observed value (X)



Note Y = Expected value * X = Observed value

APPENDIX III

Table 4: Outlier analysis of the resilience measure (*n* = 3)

		Statistic	Standard Error
Mean		-0.06	0.12606
95 % Confidence interval for mean	**Lower bound**	-0.3182	
	Upper bound	0.2022	
5 % Trimmed mean		-0.0622	
Median		-0.07	